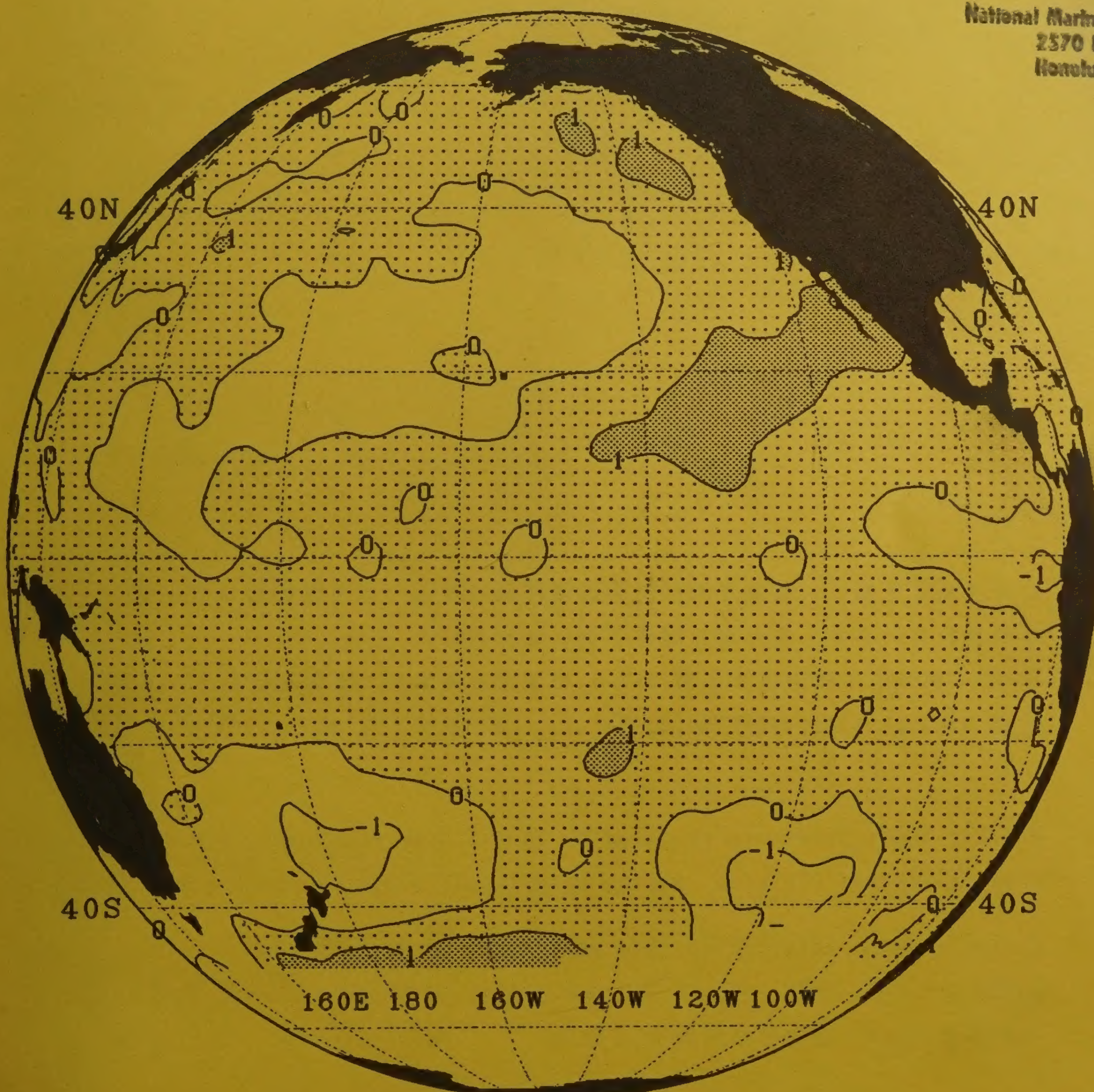
気象庁海洋月報

Monthly Ocean Report
March 1994 (No.15)



El Niño Monitoring Center
Japan Meteorological Agency

気象庁海洋気象部海洋課
エルニーニョ監視センター

平成6年3月

気象庁海洋月報は、気象庁海洋気象部海洋課エルニーニョ監視センターで
作成されています。本月報に関する問い合わせは、
〒100 東京都千代田区大手町 1-3-4 気象庁エルニーニョ監視センターまで。
電話 03-3212-8341(内線5134,5135) ファクシミリ 03-3211-3047

Monthly Ocean Report is prepared by the El Niño Monitoring Center(ENMC), Oceanographical Division, Marine Department, Japan Meteorological Agency.

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表紙は1994年3月の太平洋の月平均海面水温偏差図です。
陰影部は平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for March 1994 in the Pacific Ocean. Areas of positive anomalies are shaded.

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海況の特徴（1994年3月）

太平洋の海況

太平洋赤道域の海面水温は、ペルーの沖合で平年より１℃以上低かったほかは、全般に平年並だった。エルニーニョ監視海域（4°Ｓ～4°Ｎ，150°Ｗ～90°Ｗ)の海面水温偏差は、0.0℃だった（第１表、第１図、第６図）。

赤道域の表層混合層は、西部では28℃以上の暖水層が厚くなる傾向が続き、3月には70ｍに達した。一方、中部では水温が低下し、1989年5月以降始めて27℃以下となった（第９図）。

北太平洋の海面水温は、30～40°Ｎにおいて、日本近海から160°Ｗにかけて平年より高かったが、20～30°Ｎの170°Ｅから140°Ｗにかけては平年より低かった。カリフォルニア半島沖及びアラスカ湾沖では平年より１℃以上高い状態が続いていた（第１図）。

日本近海の海況

日本近海の海面水温は、日本海西部から東シナ海及び北海道から関東にかけての沖合を除き、平年より高く、特に、本州南方、日本海中部では0.5℃以上高かった（第17図）。

黒潮は、日本の南岸に沿ってほぼ直進した後、房総半島沖を東に流れていた（第20図）。

本州東方の親潮系の冷水(深さ100ｍで５℃以下)は38.3°Ｎ・142.6°Ｅまで達していた（第19図）。

熱帯の気象

西部熱帯太平洋の対流活動は、140°Ｅ以西で活発であった。海洋大陸付近の上層雲量指数（HCLD-MC）は11か月ぶりに正の値（＋０．８）となった。赤道域の東西風は上層で西風偏差、下層で東風偏差が持続した。一方、対流圏下層の高度場では日付変更線の西側で正偏差、東側で負偏差の偏差パターンが再び現われ、南方振動指数（ＳＯＩ）は負の値（－０．８）となった（第１表、第12図、第13図）。

［気象庁長期予報課提供］

気象庁では、最近、北太平洋海面の熱（潜熱、顕熱、長波放射、短波放射）及び運動量のフラックスの30年間（1961～1990年）の月別平均分布を作成した。その一例をⅲページに紹介する。

詳細については、海洋気象部海上気象課(FAX 03-3211-6908)にお問合せください。

HIGHLIGHTS March 1994

Pacific

Sea surface temperatures (SSTs) in the equatorial Pacific were normal except in off Peru where SSTs were more than 1°C below normal. The SST index for region B (refer to Fig. 6) was 0.0°C (Table 1 and Figs. 1, 6).

The thickness of surface warm water (warmer than 28°C) in the western equatorial Pacific continued to thicken. The thickness became 70m in March. On the other hand, temperature of the surface mixed layer in the central equatorial Pacific falled below 27°C for the first time since May 1989 (Fig. 9).

In the North Pacific Ocean, SSTs were above normal between 30°N and 40°N from Japan to 160°W, and lower than normal between 20°N and 30°N from 170°E to 140°W. SSTs off Baja California and off the Gulf of Alaska continued to be 1°C above normal (Fig. 1).

Seas adjacent to Japan

SSTs in the seas adjacent to Japan were above normal except from the western part of the Japan Sea to the East China sea and from off Hokkaido to off Kanto. Especially SSTs off south of Honshu and central of the Japan Sea were more than 0.5°C above normal (Fig.17).

The Kuroshio flowed straight along the south coast of Japan, and then it flowed eastward off the Boso Peninsula (Fig.20).

The Oyashio cold water (colder than 5°C at a depth of 100m) extended southward to 38.3°N, 142.6°E (Fig.19).

Atmospheric conditions in the tropics

The enhanced convection was observed in the west of 140°E. The high-cloud amount index near the Maritime Continent (HCLD-MC) returned positive for the first time since May 1993. Both low level equatorial easterlies and upper level equatorial westerlies were stronger than normal. On the other hand, the dipole pressure pattern in the lower troposphere, featuring positive anomalies in the west of the date line and negative one in the east, was observed. Then, the SOI returned negative (-0.8) (Table 1 and Figs. 12,13).

[prepared by the Long-range Forecast Division, JMA]

Sea-surface fluxes of heat and momentum in the North Pacific

北太平洋海面の熱及び運動量フラックス（月別平均分布：1961～1990）

The Japan Meteorological Agency (JMA), as one of the responsible centres of the Marine Climatological Summaries Scheme developed by the World Meteorological Organization, is operationally archiving maritime meteorological data taken by merchant vessels of the world. Processing these data, the JMA has recently prepared monthly mean distribution of momentum (north-south and west-east components) and heat (latent heat, sensible heat, long-wave radiation and short-wave radiation) fluxes averaged for 30-year from 1961 through 1990 in the North Pacific. Figure shows examples of the monthly mean distribution of the fluxes. Further inquiry on the products may be addressed to:

Maritime Meteorological Division
Marine Department, Japan Meteorological Agency
1-3-4 Otemachi Chiyoda-ku Tokyo 100 Japan
Facsimile No. +81 3 3211 6908

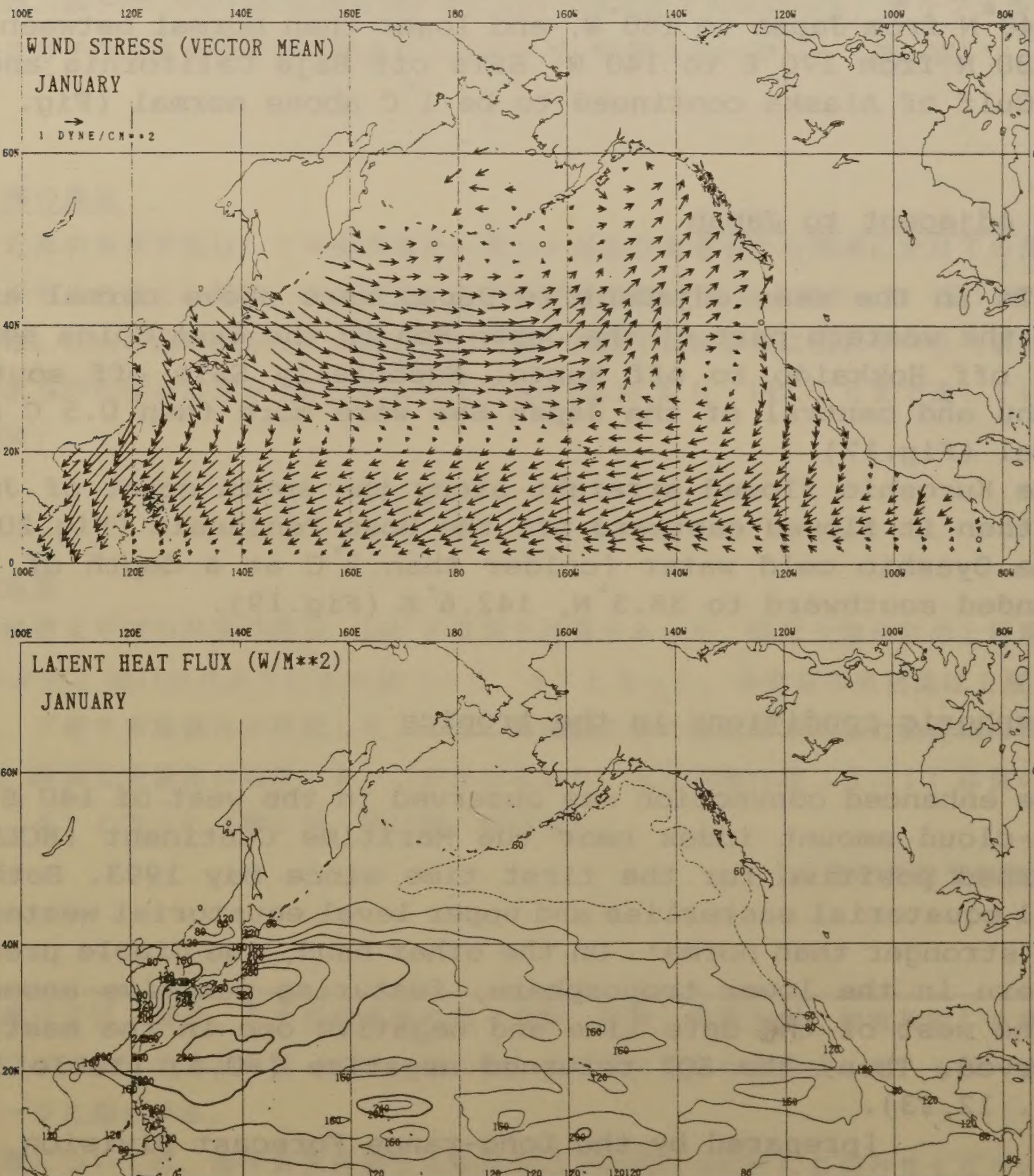


Figure　Monthly-mean of momentum (upper panel) and latent heat flux (lower panel) for January

図　1月の月平均運動量フラックス（上図）と潜熱フラックス（下図）

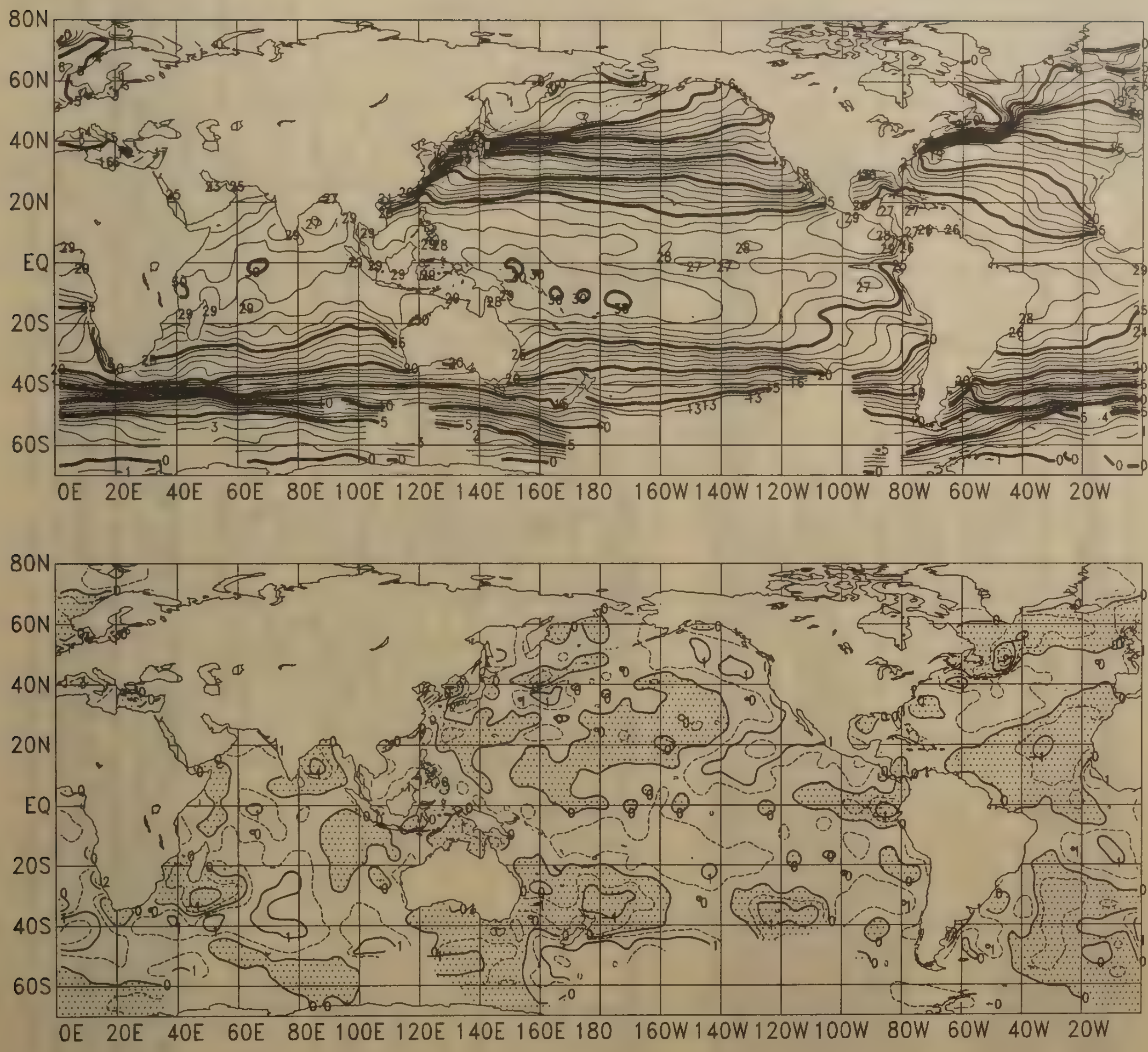
Date		1992			1993											1994		
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
Pacific Sea Surface Temperature (℃)																			
D	(14N~ Eq.)	29.5	29.0	28.7	28.0	28.0	28.2	28.6	28.8	29.2	29.1	28.9	29.1	29.1	29.5	29.1	28.4	28.5	28.6
	(130E~150E)	+0.2	-0.2	-0.2	-0.5	-0.3	-0.2	-0.2	-0.3	-0.1	-0.1	-0.2	-0.1	-0.2	+0.3	+0.2	-0.1	+0.2	+0.2
A	(4N~ 4S)	28.8	28.7	28.8	28.5	28.4	28.4	28.7	29.0	29.1	29.1	28.8	29.1	28.8	28.9	28.7	28.2	28.0	28.2
	(160E~150W)	+0.4	+0.3	+0.6	+0.5	+0.4	+0.3	+0.5	+0.5	+0.6	+0.6	+0.4	+0.8	+0.4	+0.5	+0.5	+0.2	0.0	+0.1
B	(4N~ 4S)	24.6	24.7	25.0	25.5	26.6	27.4	28.1	28.0	27.0	25.8	24.9	24.8	25.0	25.2	25.3	25.7	26.1	26.9
	(150W~ 90W)	0.0	+0.1	+0.1	+0.1	+0.4	+0.5	+1.0	+1.4	+0.9	+0.6	+0.3	+0.2	+0.4	+0.6	+0.4	+0.3	-0.1	0.0
C	(Eq.~ 10S)	20.8	21.2	22.5	24.3	26.1	27.0	26.4	25.2	23.3	22.1	21.0	20.8	21.3	21.5	22.8	24.7	26.0	25.3
	(90W~ 80W)	+0.1	-0.3	-0.1	0.0	+0.4	+1.1	+1.3	+1.3	+0.6	+0.5	+0.4	+0.5	+0.6	0.0	+0.2	+0.4	+0.3	-0.6
Pacific Sea Level Anomaly (cm)																			
YAP	(10N,138E)	9	6	8	7	9	11	1	-2	-2	1	-1	5	8	8	10	7	7	
RABAUL	(4S,152E)	-6	-6	-6	-9	-10	-14	-12	-13	-11	-8	-9	-7	-6	-5	-2	-1	3	
MAJURO	(7N,171E)	15	6	4	-1	-4	-4	-8	-1	6	5	3	1	5	2	3	2	2	
TARAWA	(1N,173E)	2	2	4	1	7	10	3	5	6	4	7	4	6	2	1	6	-1	
CHRISTMAS	(2N,157W)	-3	4	1	5	4	8	6	5	-1	-2	-1	-1	-2	-1	-7	-3	-7	
SANTA CRUZ	(1S, 90W)	-1	-1	-2	4	8	7	7	10	4	0	0	1	3	0	0	-1	0	

第１表 (a) エルニーニョ監視指数

Table 1(a) El Niño monitoring indices. Data sources are the El Niño Monitoring Center, JMA for the sea surface temperature and the SOC of ISLP-PAC, Dept. of Oceanography, University of Hawaii for the sea level anomaly.

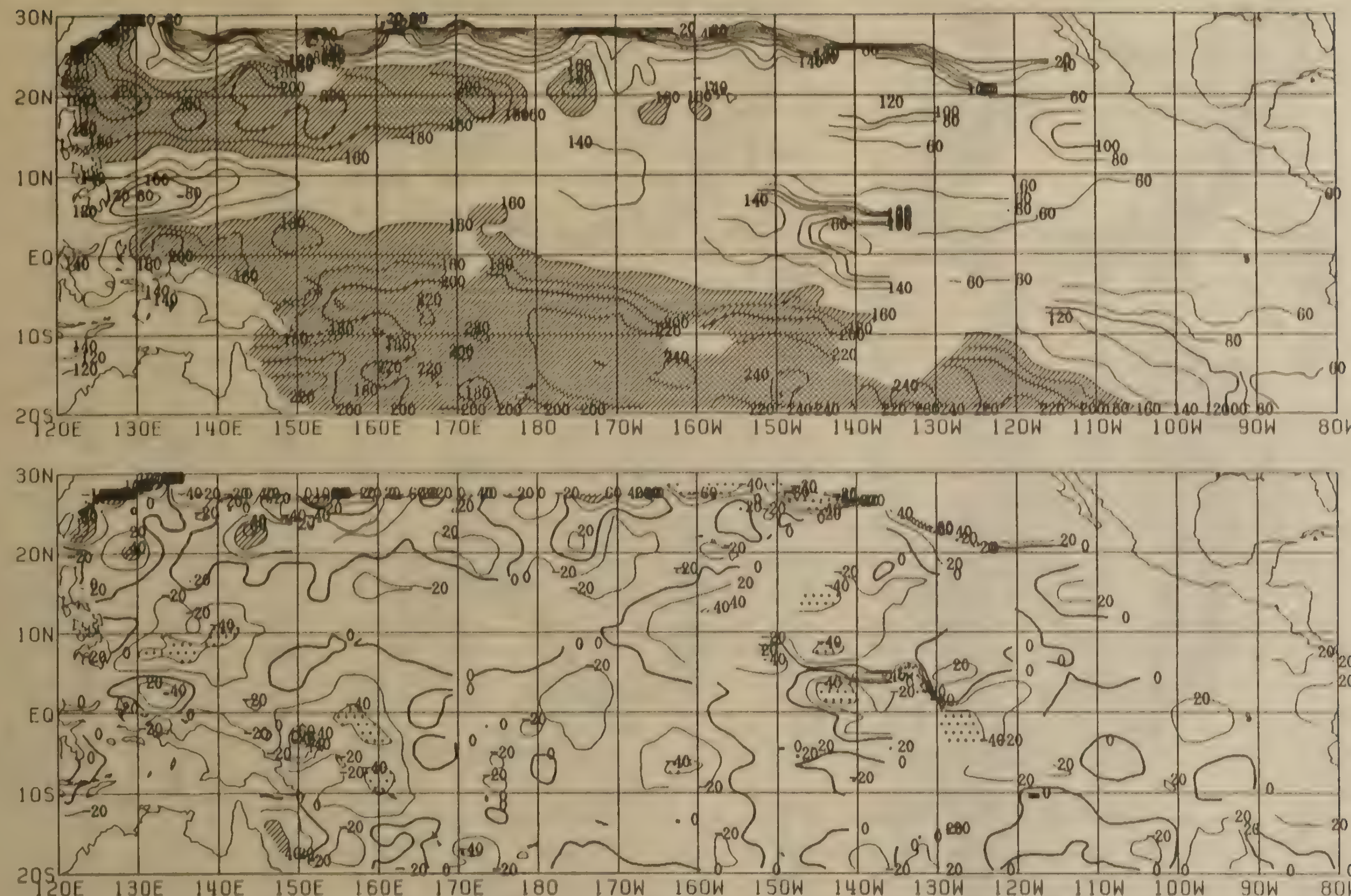
Date	1992 OCT	1992 NOV	1993 DEC	1993 JAN	1993 FEB	1993 MAR	1993 APR	1993 MAY	1993 JUN	1993 JUL	1993 AUG	1993 SEP	1993 OCT	1993 NOV	1993 DEC	1994 JAN	1994 FEB	1994 MAR
Southern Oscillation Index (Unit of pressure anomalies at Tahiti and Darwin : hPa)																		
SOI (TAHITI-DARWIN)	-2.0	-0.6	-0.5	-0.8	-0.6	-0.5	-1.9	-0.8	-1.6	-1.0	-1.5	-0.7	-1.4	-0.0	0.2	-0.2	0.1	-0.8
TAHITI (17.5S , 150W)	-2.3	-0.5	-1.1	-1.4	-1.9	1.0	-0.7	0.2	-0.6	-1.1	0.0	-0.0	-0.9	0.1	-0.0	-0.1	0.0	-0.1
DARWIN (12.5S , 131E)	0.5	0.6	-0.2	0.4	-0.3	2.4	1.9	1.4	1.3	0.4	2.2	1.4	1.3	0.1	-0.5	0.3	-0.2	1.7
High Cloud Amount Index																		
HCLD-PH (20N ~ 10N) (110E ~ 140E)	0.9	-1.7	-1.4	-1.0	-0.3	-0.4	-0.5	-2.2	-1.9	-0.5	-0.4	0.7	-0.1	-0.6	1.2	-0.5	-0.5	0.6
HCLD-MC (5N ~ 5S) (110E ~ 135E)	0.6	-0.8	0.4	-1.1	-0.9	-1.1	0.3	-1.4	-2.1	-1.0	-1.4	-1.0	-1.5	-0.8	-0.2	-0.4	-0.5	0.8
HCLD-DL (5N ~ 5S) (170E ~ 170W)	-0.1	1.3	1.2	0.8	1.4	0.5	2.8	2.0	1.8	1.3	0.3	1.8	1.7	-0.2	0.0	0.0	-0.7	-0.6
Equatorial Zonal Wind Index																		
U200-IN (5N ~ 5S) (80E ~ 100E)	-1.4	0.1	0.1	-0.1	0.8	-0.9	-0.3	0.5	0.4	-0.3	-0.5	-2.1	-0.7	-0.8	-1.8	-0.4	-0.8	-1.5
U200-CP (5N ~ 5S) (180 ~ 125W)	0.7	-0.2	0.7	-0.3	-0.3	0.0	-0.6	-1.3	-0.0	1.1	0.3	-0.3	0.0	-0.5	0.4	0.4	0.8	0.2
U850-WP (5N ~ 5S) (160E ~ 175W)	0.2	0.4	0.8	0.3	0.9	0.3	0.8	0.5	0.3	0.1	0.7	-0.0	0.9	-0.4	-0.7	-1.2	-1.0	-0.6
U850-CP (5N ~ 5S) (170W ~ 135W)	-0.4	0.9	0.2	0.2	0.0	-0.1	0.3	0.6	0.6	-0.8	0.1	0.2	0.4	0.3	-0.5	-0.6	-0.9	-0.2
U850-EP (5N ~ 5S) (130W ~ 100W)	-1.2	1.9	-0.0	0.1	-0.1	0.2	0.5	0.9	0.7	-0.4	0.8	1.0	0.2	0.9	0.2	0.1	-0.4	0.1

第１表 (b) エルニーニョ監視指数(続き)
Table 1(b) El Niño monitoring indices (continued) .
Data source for these atmospheric conditions is the Long-range Forecast Division, JMA.

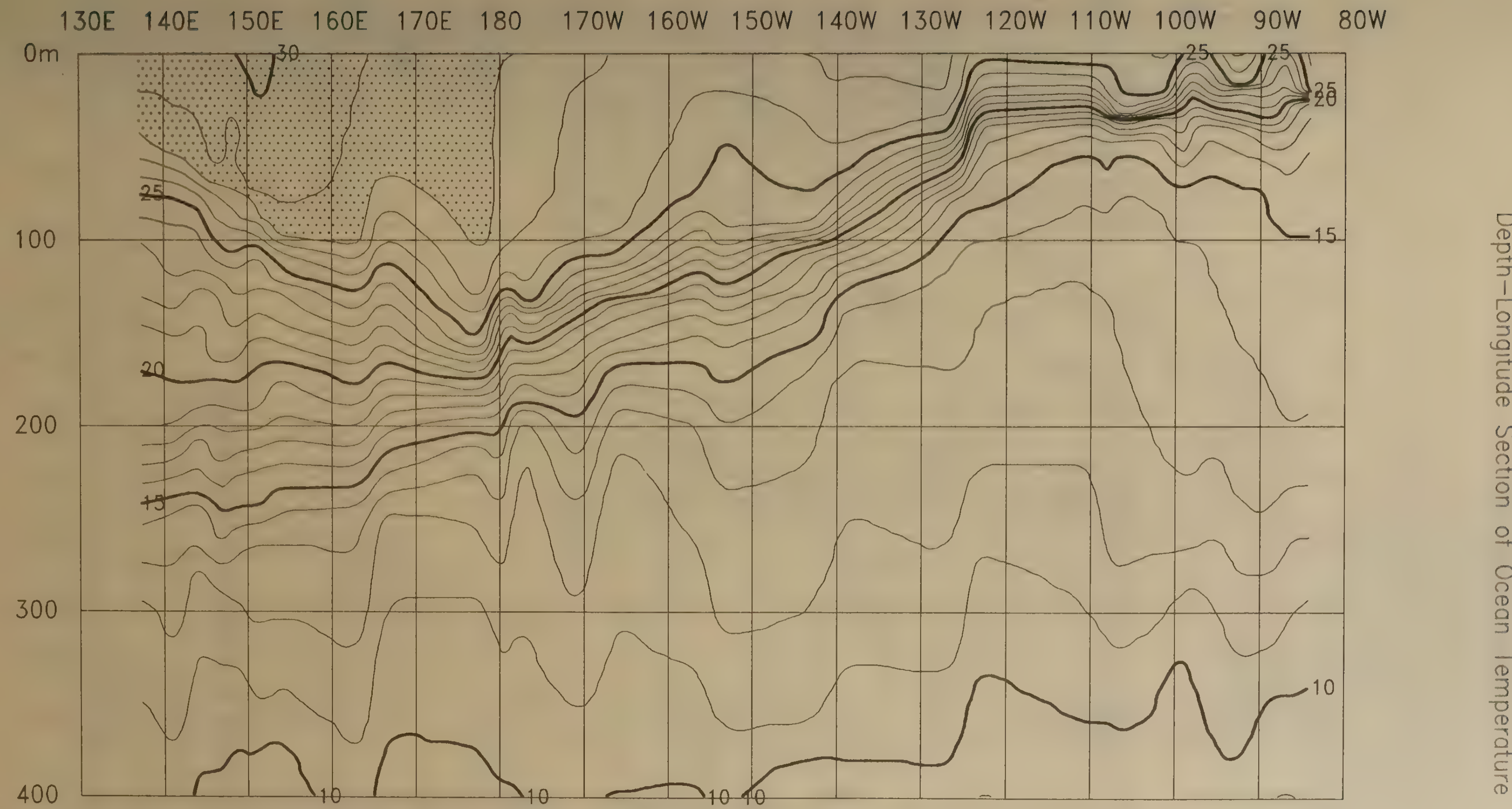


第１図　全球月平均海面水温図（上）及び偏差図（下）（1994年 3月）

Fig.1 Monthly mean sea surface temperature in the global ocean (top) and anomalies (bottom) for MAR 1994. Anomalies are computed with respect to the JMA climatology (1961–90) (Climatic charts of sea surface temperatures of the western North Pacific and the global ocean, March 1991). The Contour interval is 1°C and additional anomaly contours of ±0.5°C are shown as broken lines. Negative anomalies are stippled.

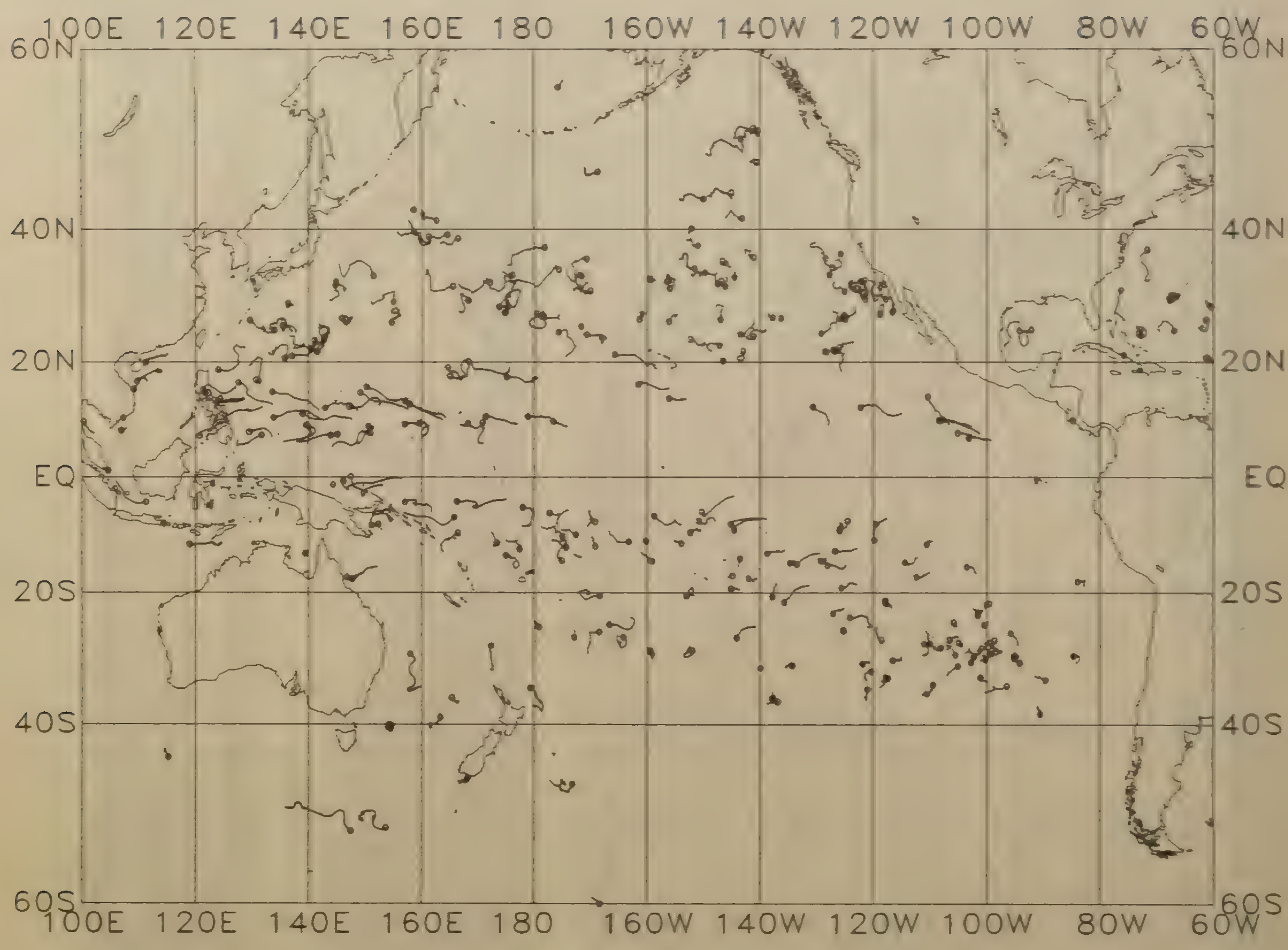


第２図　太平洋表層水温（20℃深度）図（上）及び偏差図（下）（1994年 3月）
Fig.2　The depth of a 20° C isotherm in the Pacific Ocean (top) and anomalies (bottom) for MAR 1994.　Anomalies are computed with respect to the climatology (Levitus, 1982, Climatological Atlas of the World Ocean, NOAA).
The contour interval is 20m with shading for values greater than 160m (top), and shading/stippling for values greater/smaller than +40m/−40m (bottom).



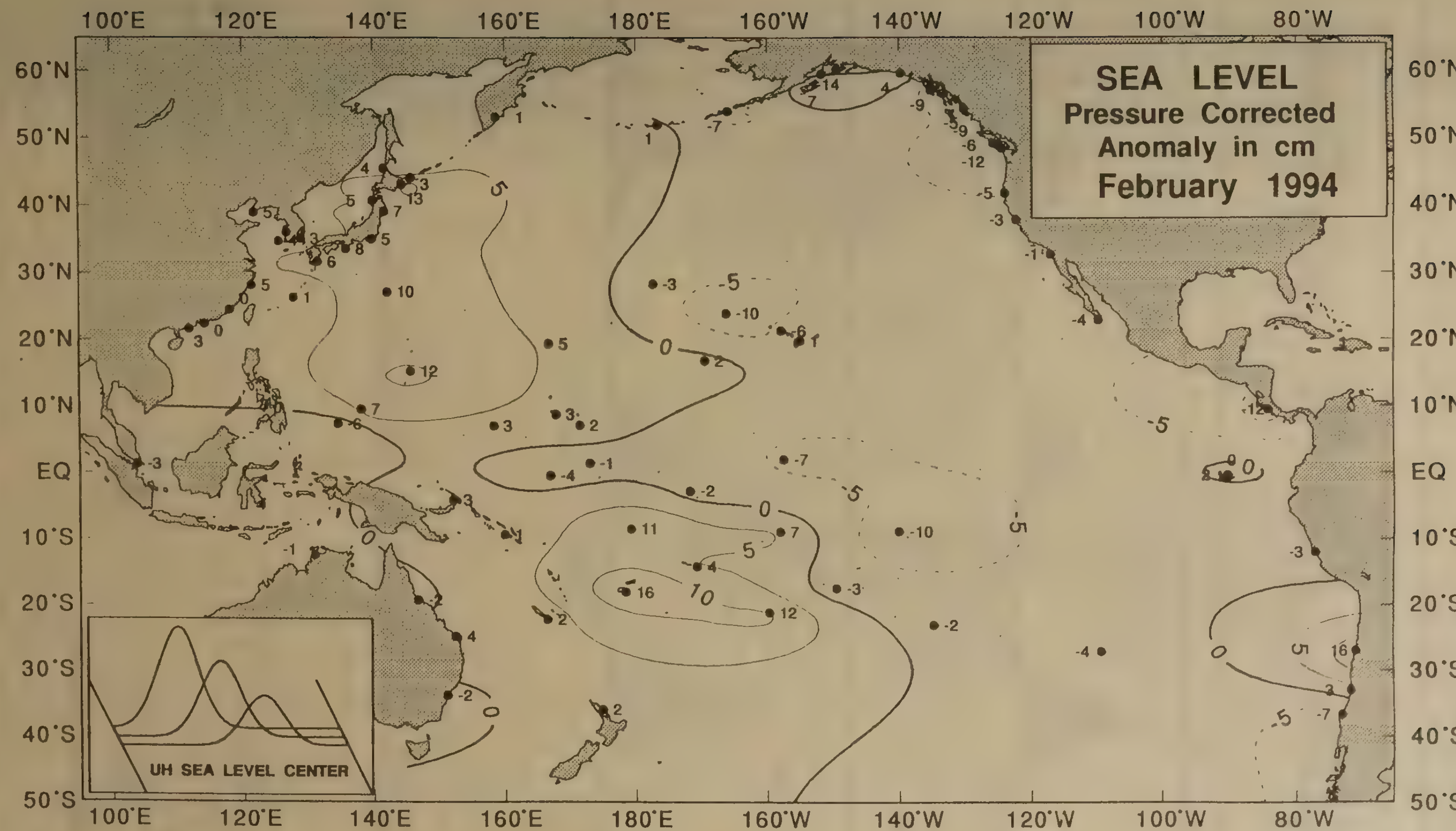
第３図　太平洋赤道に沿う表層水温断面図（1994年 3月）

Fig.3 Depth–longitude section of the Pacific Ocean temperature along the equator for MAR 1994. The contour interval is 1° C with spotted shading for values greater than 28° C.



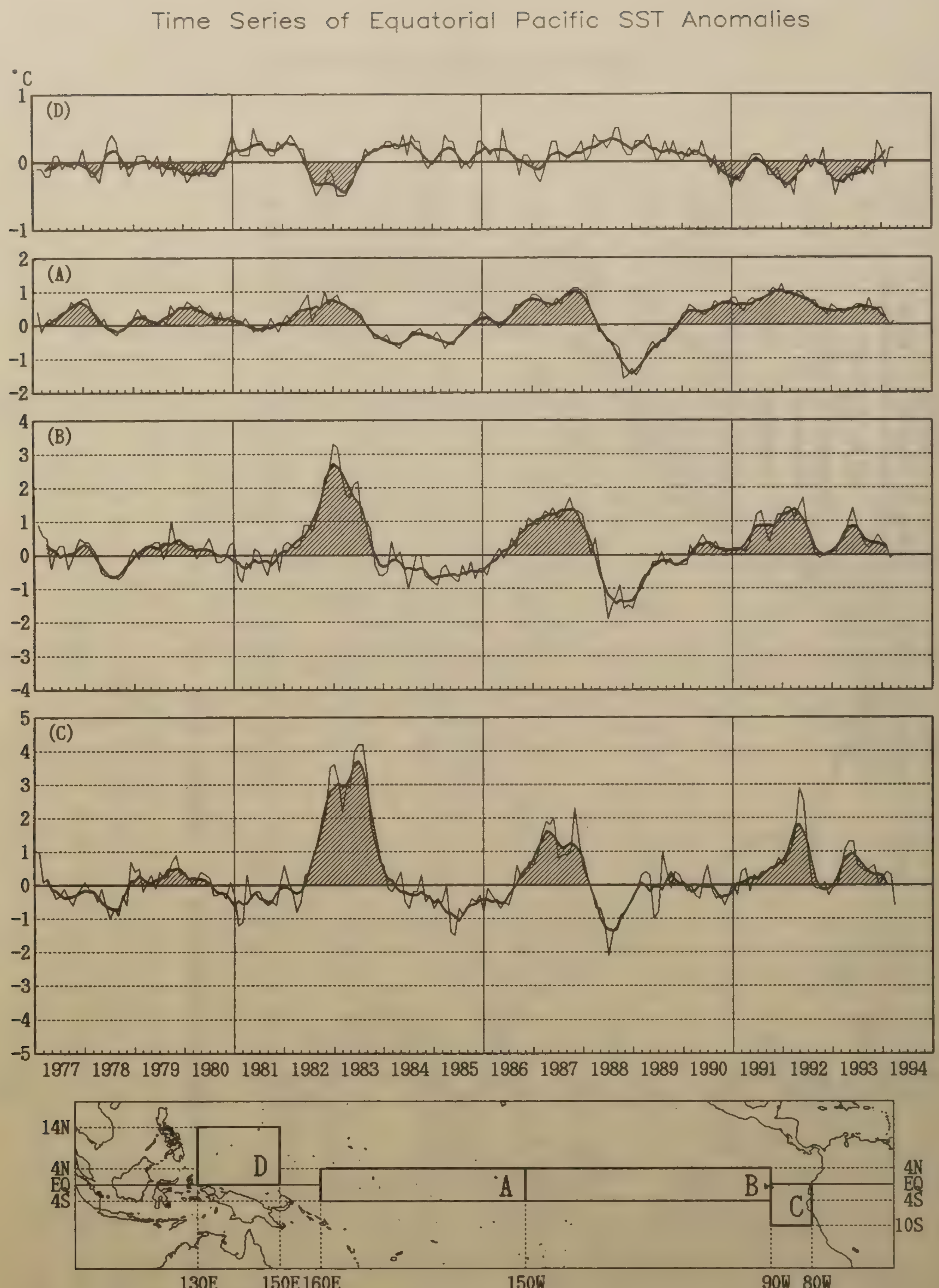
第4図　太平洋ブイ流跡図(1994年 3月)

Fig.4 Movements of drifting buoys in the Pacific Ocean during MAR 1994. Each track is one buoy, with the small circle representing the buoy's last position for the month.



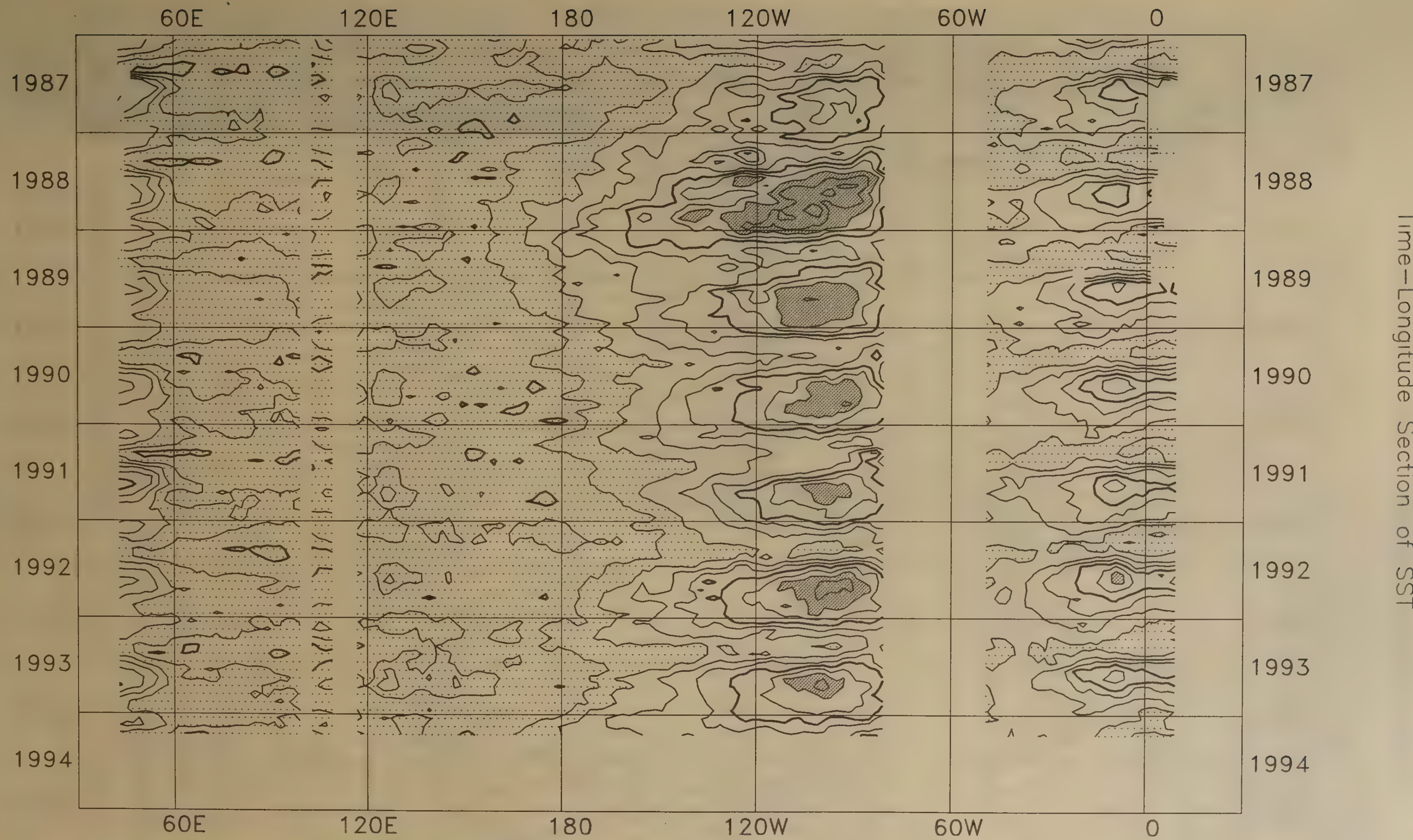
第5図　太平洋海面水位偏差図（ 1994年 2月 ）

Fig.5 Sea level anomalies obtained from the 1975 to 1986 mean FEB sea level adjusted for atmospheric pressure (FEB 1994).
This figure is prepared by the SOC of ISLP–PAC, Dept. of Oceanography, Univ. of Hawaii.



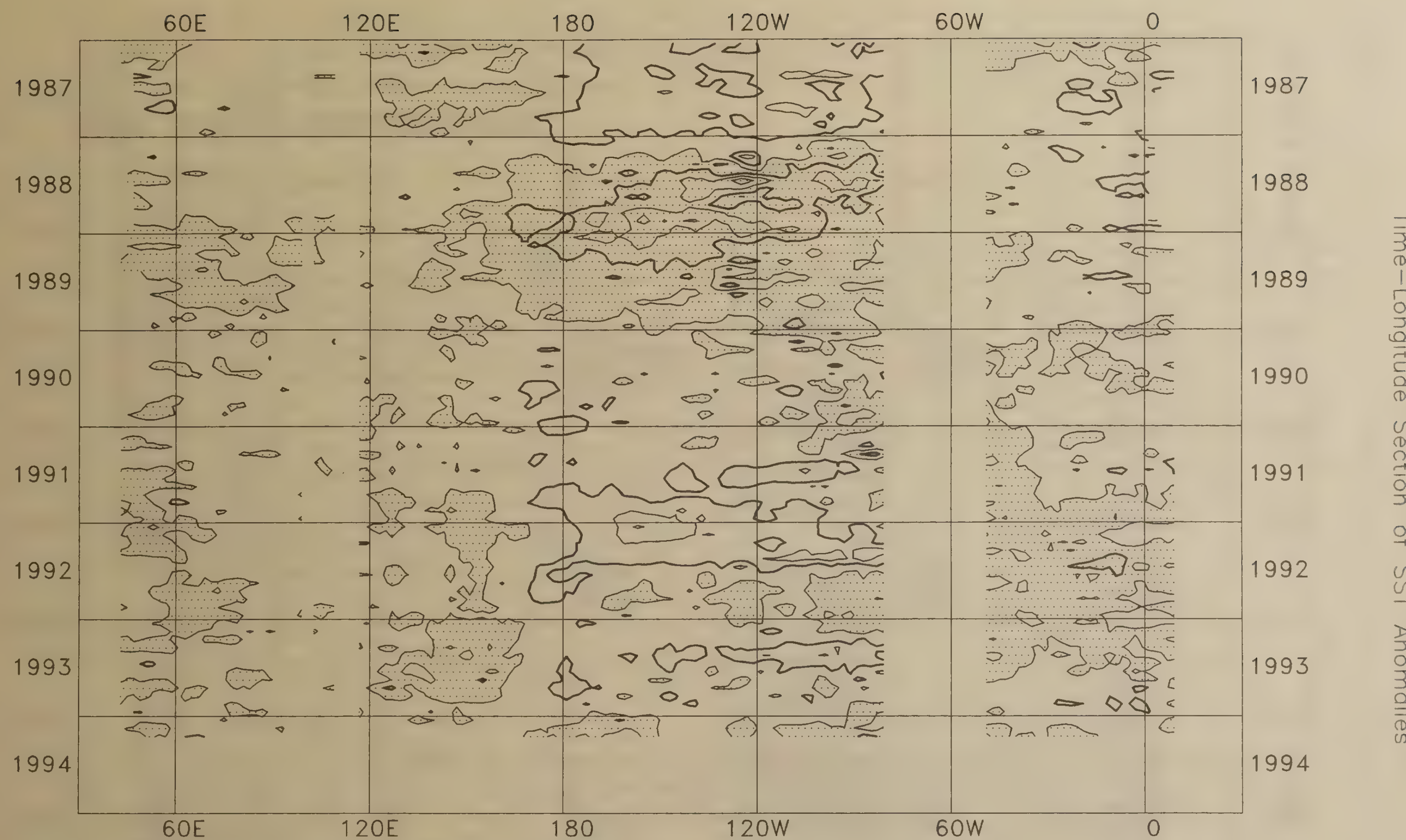
第６図　赤道太平洋海面水温偏差時系列図

Fig.6 Time series of monthly mean SST anomalies in the equotorial Pacific Ocean for the areas indicated at the bottom of the figure. Thin lines show the monthly values and thick lines their 5 month running mean. Positve anomalies (A,B,C) and negative anomalies (D) are shaded. Anomalies are computed with respect to the JMA climatology (1961–90).



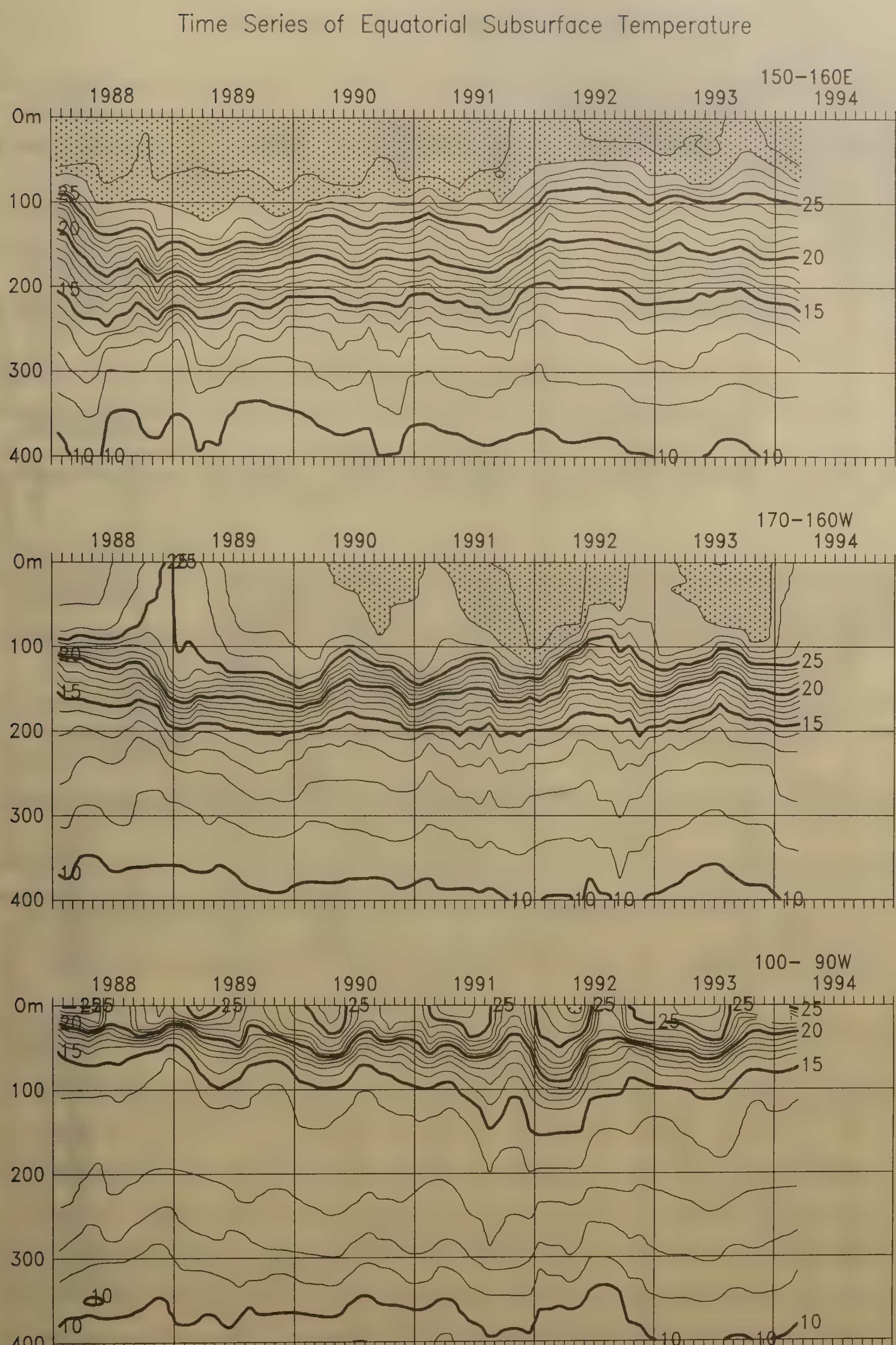
第7図　赤道に沿う海面水温時系列図

Fig.7 Time–longitude section of SSTs along the equator (2° N–2° S) in the global ocean. The contour interval is 1° C, with thick contour lines at 25 and 30° C. SST values greater than 28° C are spotted and values less than 23° C are shaded.



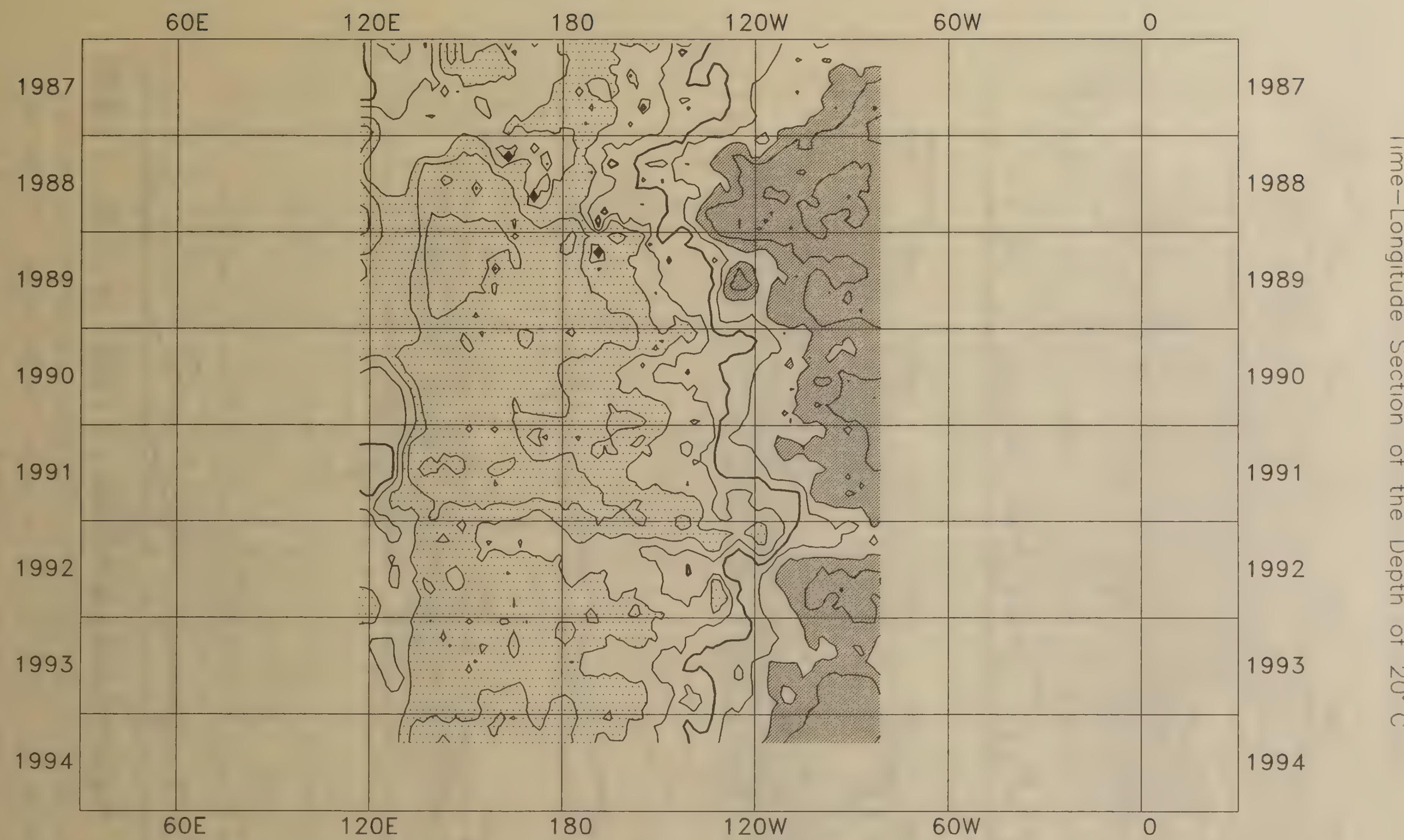
第8図　赤道に沿う海面水温偏差時系列図

Fig.8 Time–longitude section of SST anomalies along the equator (2° N–2° S) based on the JMA climatology (1961–1990). The contour interval is 1° C, with thick contour lines at +1° C and −1° C. Negative anomalies are spotted.



第９図　赤道太平洋表層水温時系列図（上：西部、中：中部、下：東部）

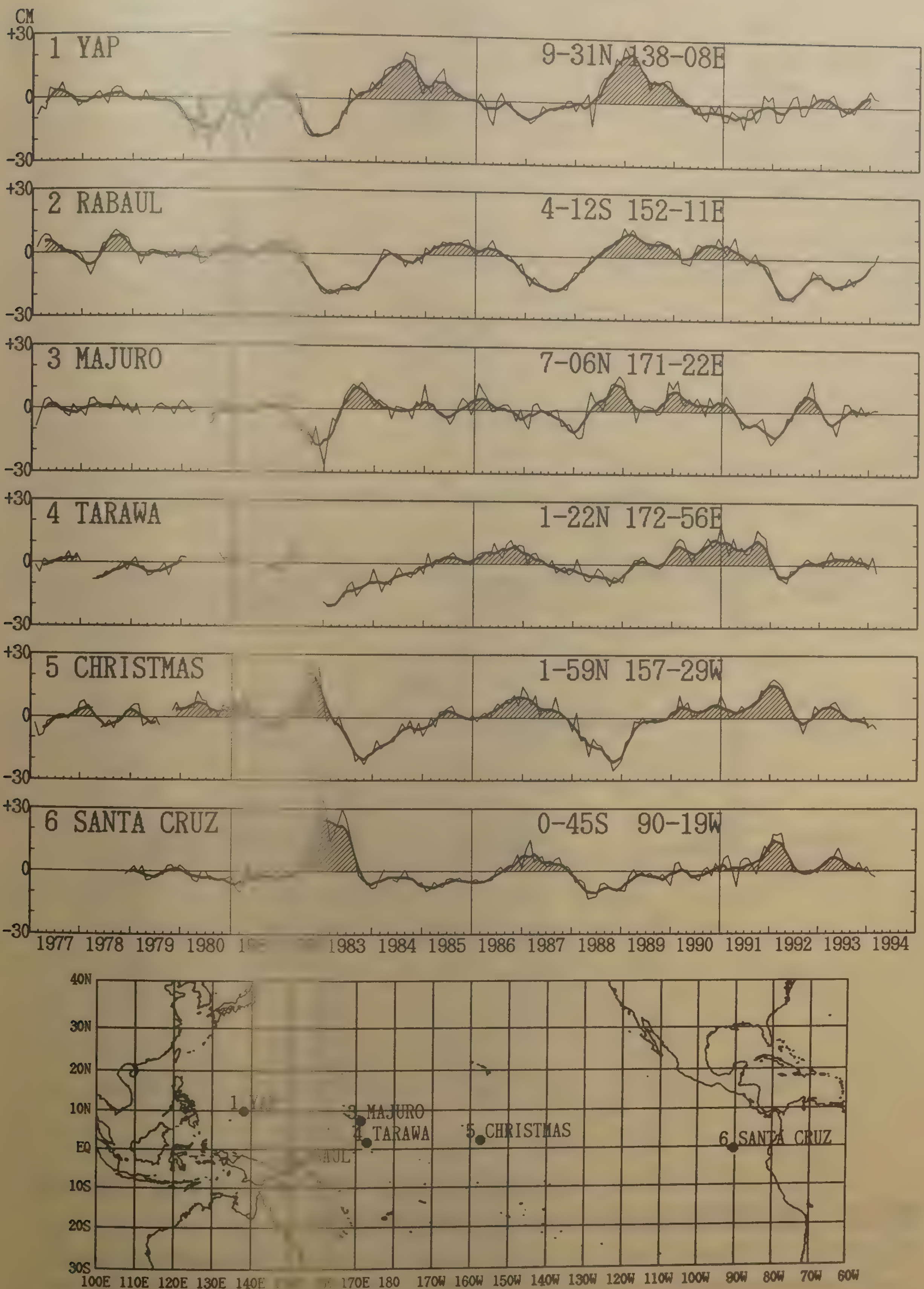
Fig.9 Time series of equatorial (2° N-2° S) subsurface temperature for the western Pacific (top, 150-160° E), the central Pacific (middle, 170-160° W) and the eastern Pacific (bottom, 100-90° W). The contour interval is 1° C with spotted shading for the values greater than 28° C.



第10図　太平洋の赤道に沿う20℃深度時系列図

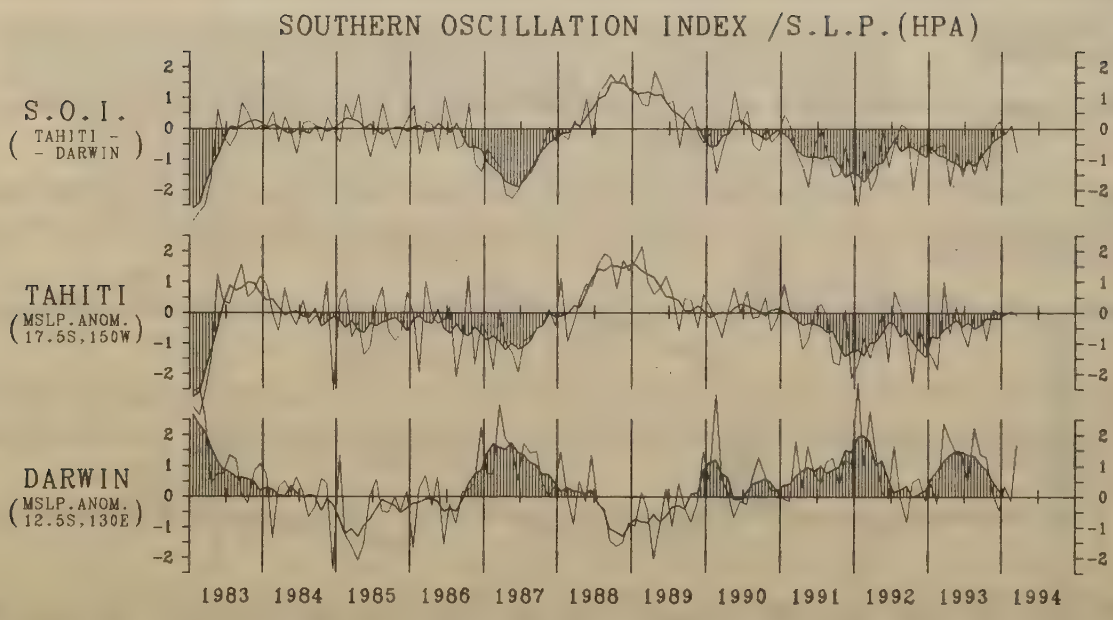
Fig.10 Time–longitude section of the depth of a 20° C isotherm along the equator in the Pacific Ocean. The contour interval is 20m with thick contour lines at 100m. Values shallower than 60m are shaded and those deeper than 140m are stippled.

series of Sea Level Anomalies



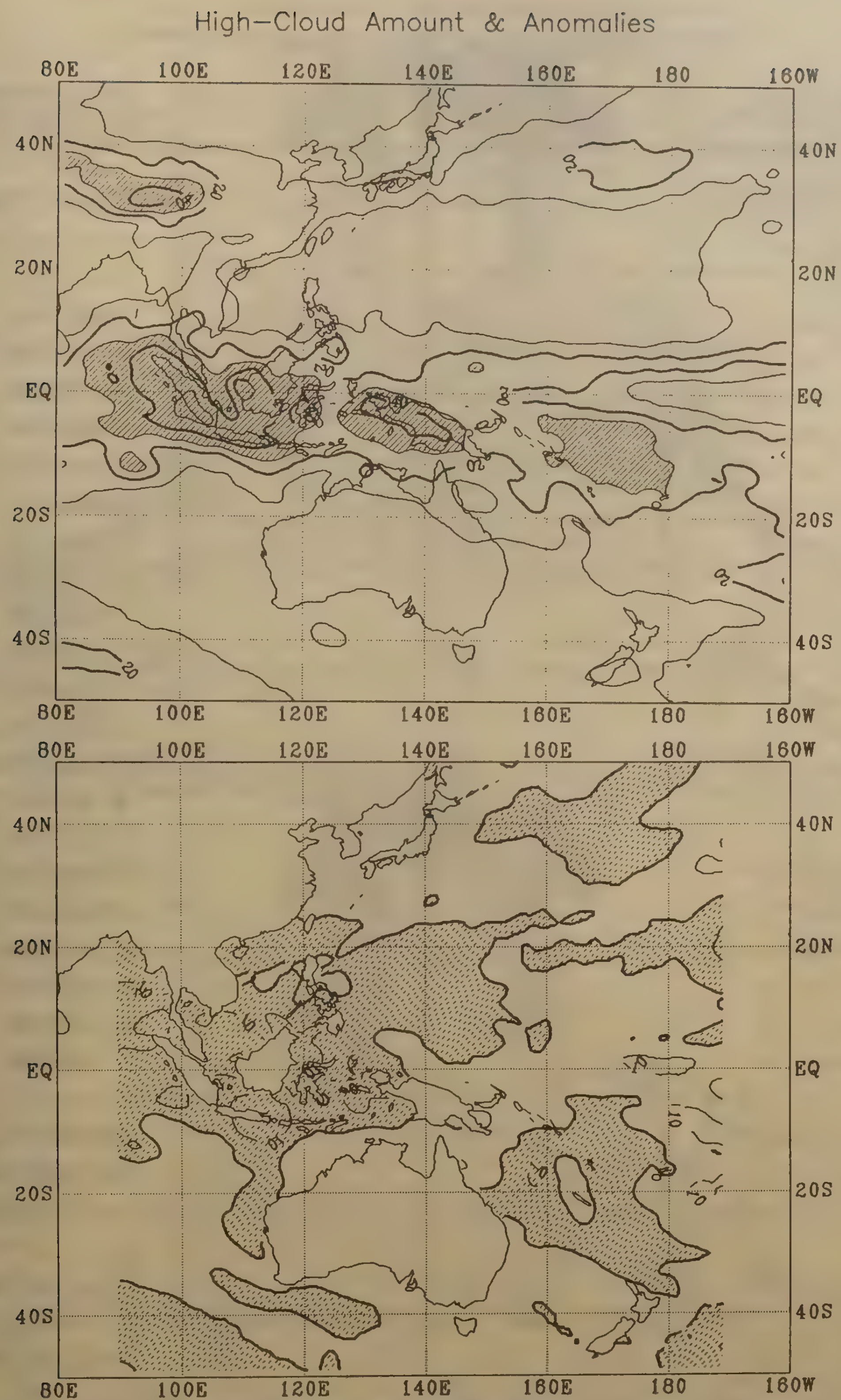
第11図　太平洋月平均海面水 系列図
Fig.11 Time series o level anomalies based on 1976 to 1990 monthly mean sea level obt om the stations indicated at the bottom of the figure. Thin li ow the monthly mean and thick lines show their 5 month runni an. Positive anomalies are shaded.

Time series of SOI & Sea Level Pressure Standardized Anomalies



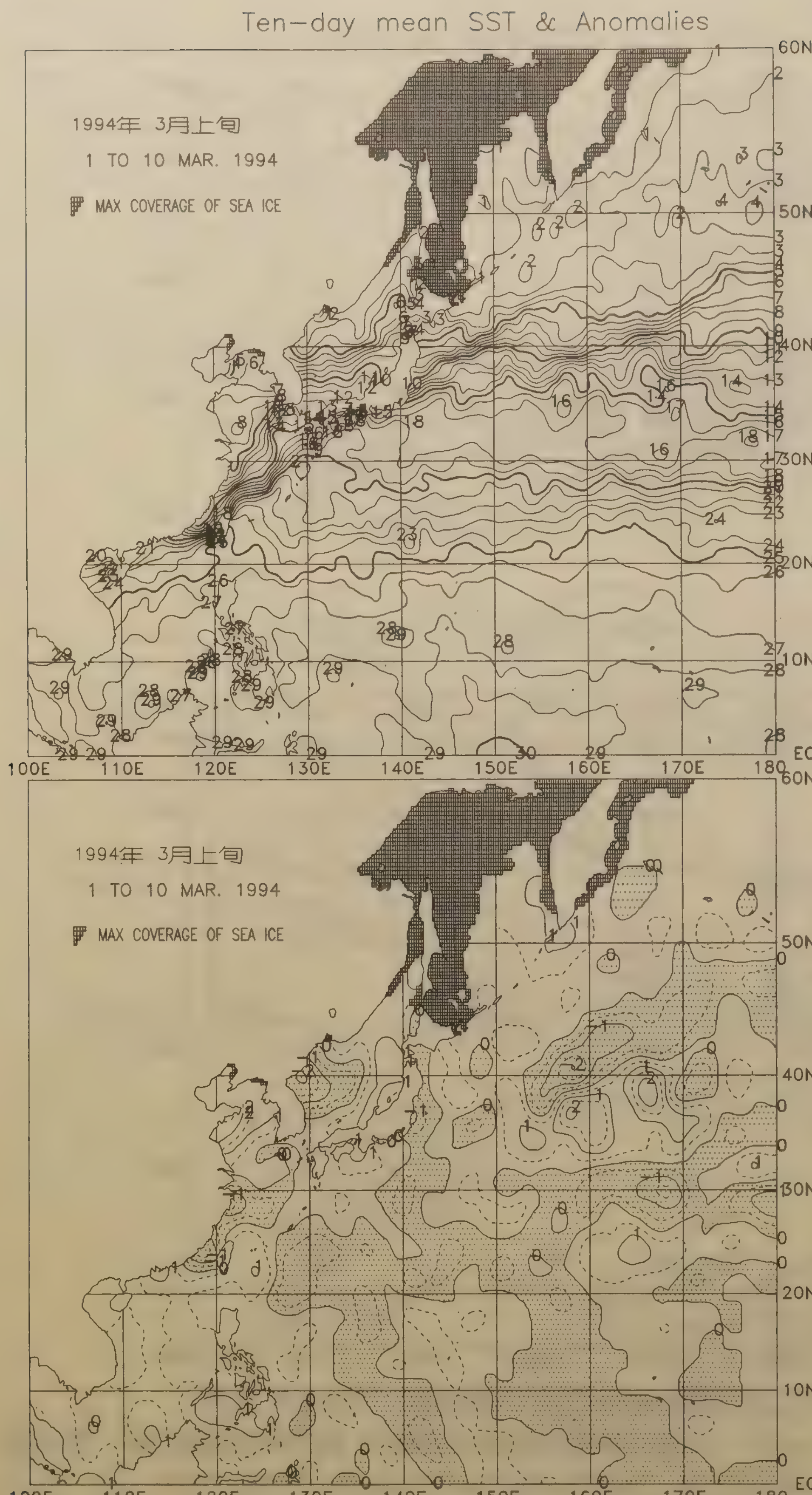
第12図　南方振動指数及び海面気圧偏差時系列図

Fig.12 The Southern Oscillation Index (top) and monthly mean sea level pressure standardized anomalies at Tahiti (middle) and Darwin (bottom). Thin lines show the monthly mean and thick lines their 5 month running mean. Negative values (top, middle) and positive values (bottom) are shaded. Base periods for normals and standard deviations are 1961−1990. This figure is prepared by the Long−range Forecast Division, JMA.



第13図　月平均上層雲量分布図及び偏差図（1994年 3月）

Fig.13 Monthly mean of the high–cloud amount (%, top) and its anomalies (%, bottom) in the equatorial Pacific for MAR 1994. The contour interval is 10%. Areas above 30% are shaded (top) and positive anomalies are stippled (bottom). Anomalies represent a departure from the 1978–1990 base period monthly means. This figure is prepared by the Long–range Forecast Division, JMA.



旬平均沿岸水温(℃)
Coastal Water Temperature

地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	22.3	+1.1
那　覇(47936)	21.5	+1.3
名　瀬(47909)	-	-
足摺岬(47898)	15.8	+0.1
潮　岬(47778)	16.8	-
御前崎(47655)	11.8	+0.7
八丈島(47678)	17.7	+1.2
館　山(47672)	13.8	+0.5
小名浜(47598)	8.7	-0.1
宮　古(47585)	7.2	+1.3
浦　河(47426)	1.6	+0.7
紋　別(47435)	-0.3	-
稚　内(47401)	2.1	-
寿　都(47421)	5.0	-
江　差(47428)	5.4	-
飛　島(47587)	8.5	+0.3
輪　島(47600)	8.4	+0.5
西　郷(47740)	11.9	-
浜　田(47755)	12.3	-
厳　原(47800)	14.1	-
牛　深(47838)	15.2	-

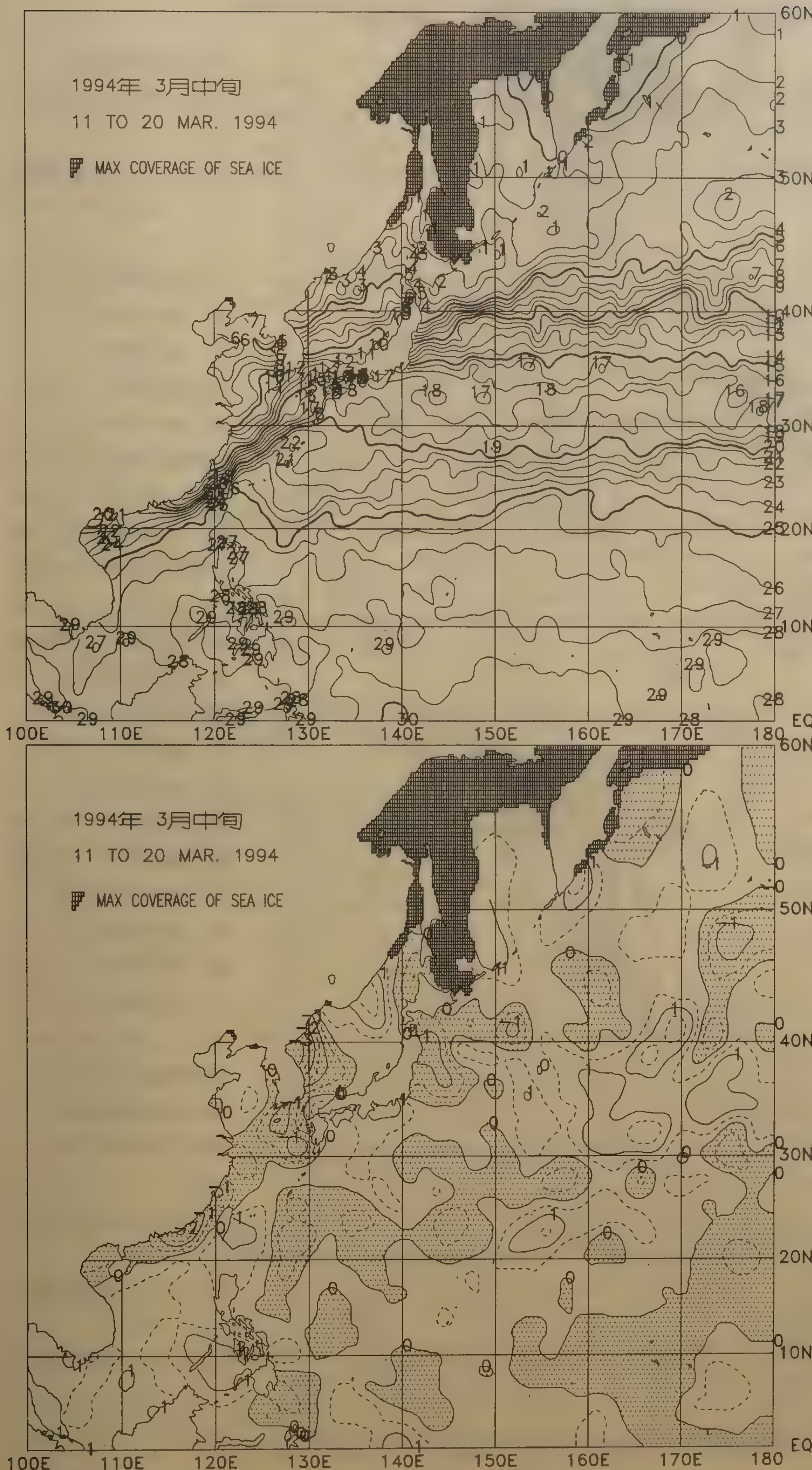
海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	8.7
四国沖	29.0N,135.0E	20.4
東シナ海	28.2N,126.3E	20.1

第14図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 3月上旬)

Fig.14 Ten–day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 1st ten–day period in MAR 1994. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.

Ten−day mean SST & Anomalies



旬平均沿岸水温(℃)
Coastal Water Temperature

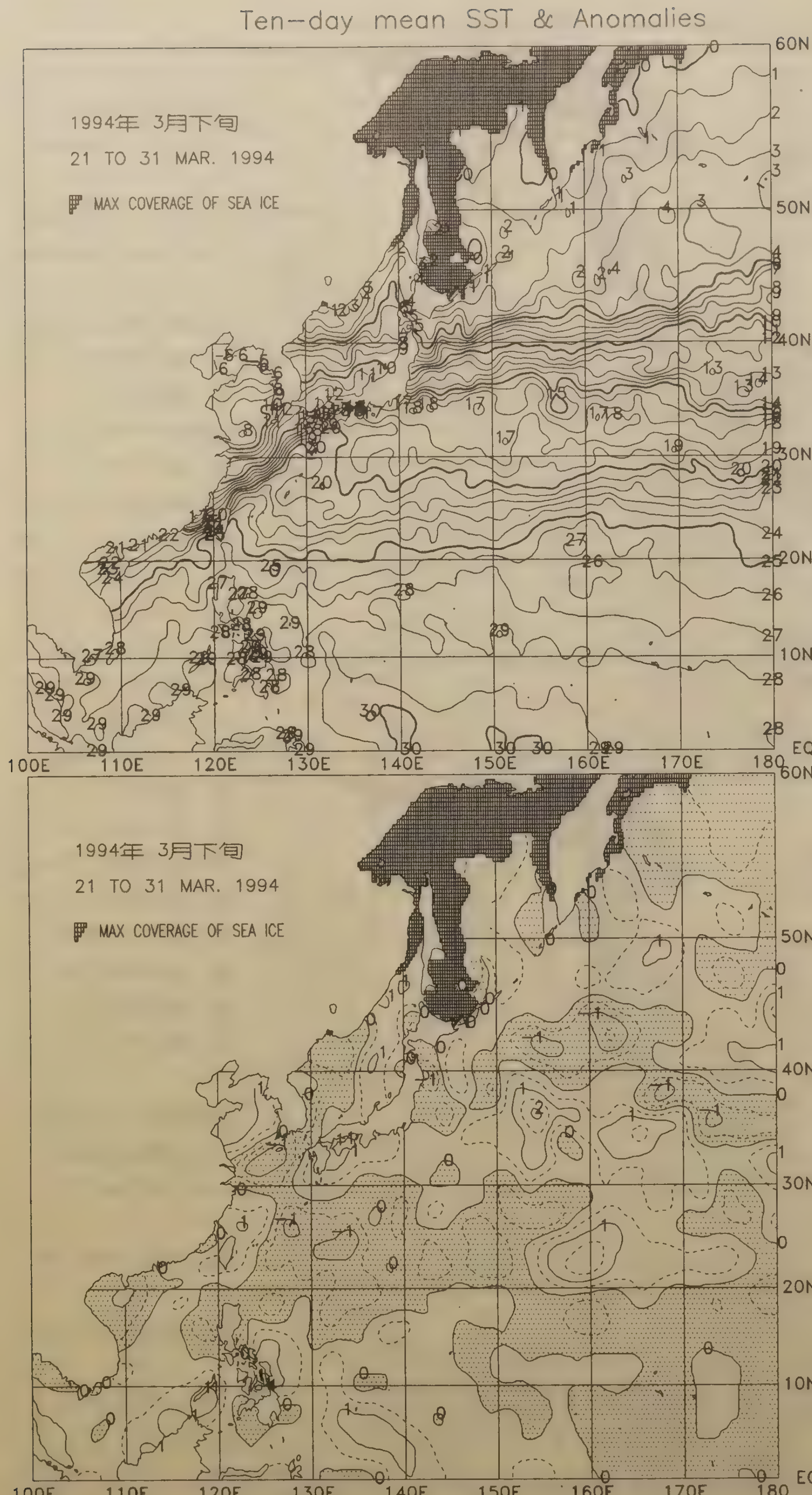
地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	22.8	+0.9
那 覇(47936)	21.5	+0.5
名 瀬(47909)	-	-
足摺岬(47898)	16.2	+0.2
潮 岬(47778)	16.7	-
御前崎(47655)	12.0	+0.2
八丈島(47678)	18.0	+0.8
館 山(47672)	14.3	+0.6
小名浜(47598)	8.5	−0.4
宮 古(47585)	6.3	+0.7
浦 河(47426)	2.0	+0.5
紋 別(47435)	0.2	-
稚 内(47401)	2.0	-
寿 都(47421)	4.4	-
江 差(47428)	4.5	-
飛 島(47587)	8.7	+0.2
輪 島(47600)	7.5	−0.9
西 郷(47740)	11.6	-
浜 田(47755)	12.0	-
厳 原(47800)	13.9	-
牛 深(47838)	15.0	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	8.8
四国沖	29.0N,135.0E	20.5
東シナ海	28.2N,126.3E	20.8

第15図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 3月中旬)

Fig.15 Ten−day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 2nd ten−day period in MAR 1994. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

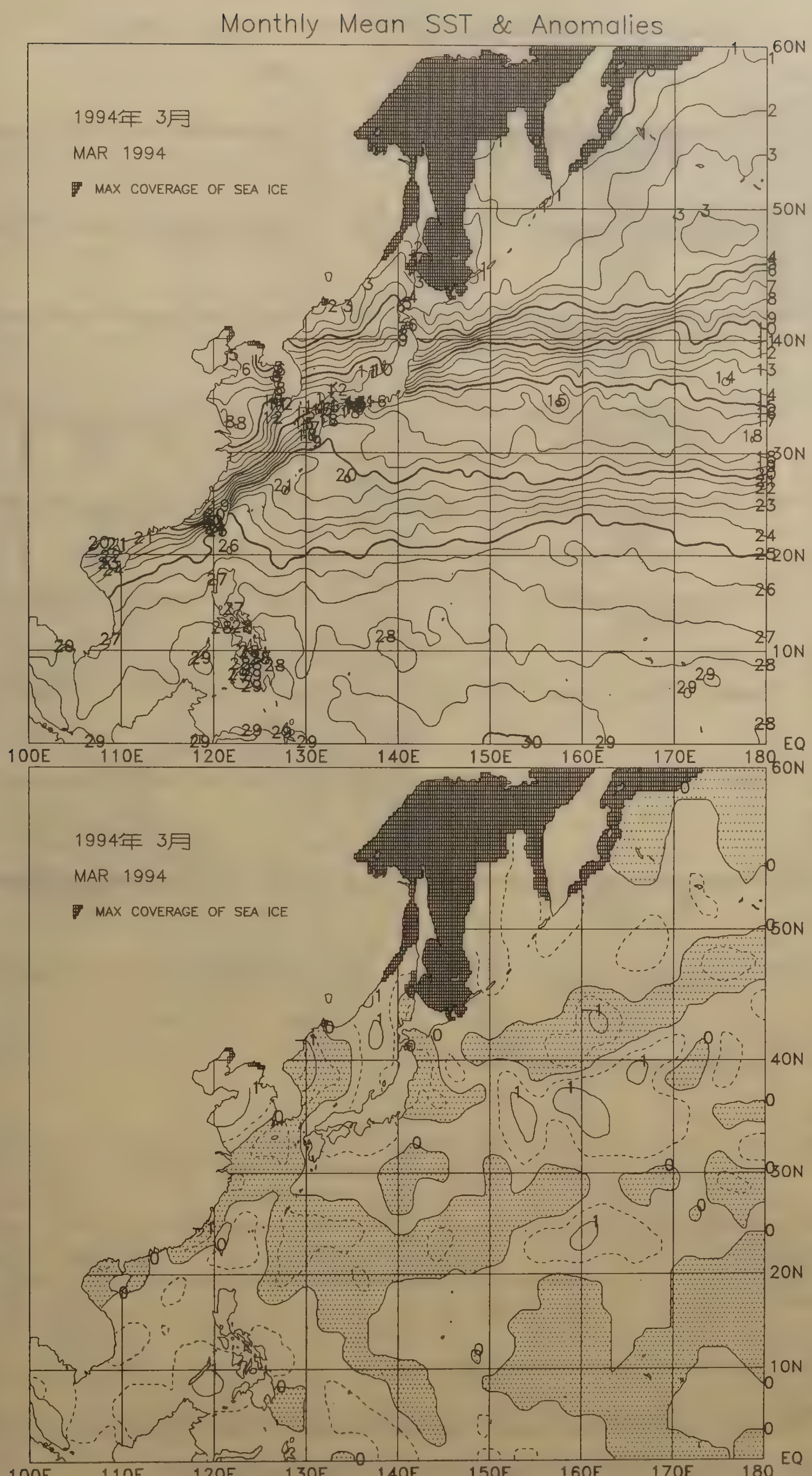
地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	22.5	+0.2
那　覇(47936)	20.7	−0.3
名　瀬(47909)	−	−
足摺岬(47898)	16.2	−0.2
潮　岬(47778)	17.7	−
御前崎(47655)	12.5	−0.2
八丈島(47678)	17.8	+0.3
館　山(47672)	13.5	−0.6
小名浜(47598)	8.6	−0.3
宮　古(47585)	6.5	+0.8
浦　河(47426)	2.2	+0.6
紋　別(47435)	1.0	−
稚　内(47401)	2.6	−
寿　都(47421)	5.2	−
江　差(47428)	5.7	−
飛　島(47587)	8.9	0.0
輪　島(47600)	8.7	−0.4
西　郷(47740)	11.8	−
浜　田(47755)	12.1	−
厳　原(47800)	14.1	−
牛　深(47838)	15.3	−

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

地点	位置	水温
日本海	37.9N,134.5E	9.8
四国沖	29.0N,135.0E	20.4
東シナ海	28.2N,126.3E	21.3

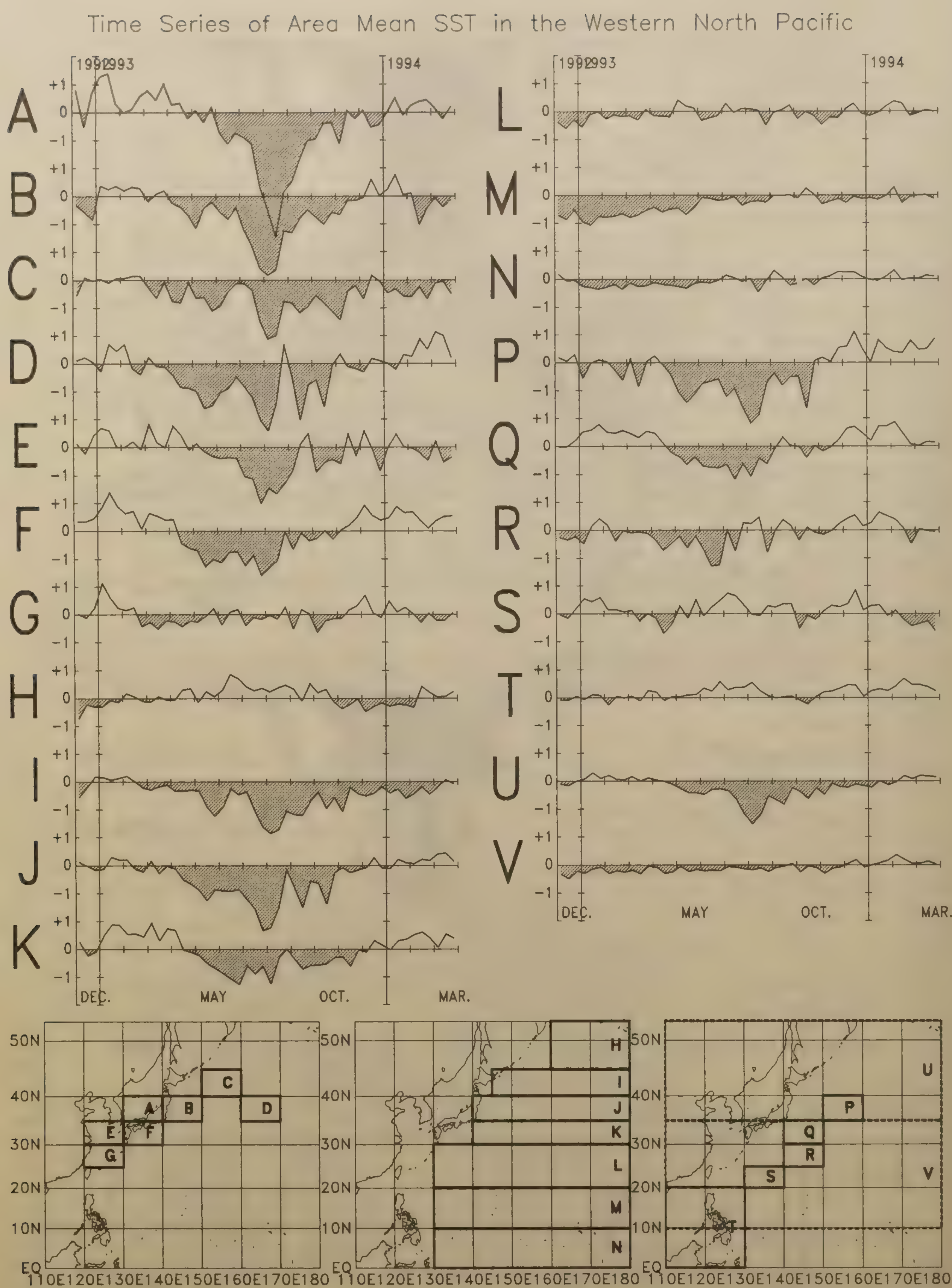
第16図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 3月下旬)

Fig.16 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 3rd ten-day period in MAR 1994. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.



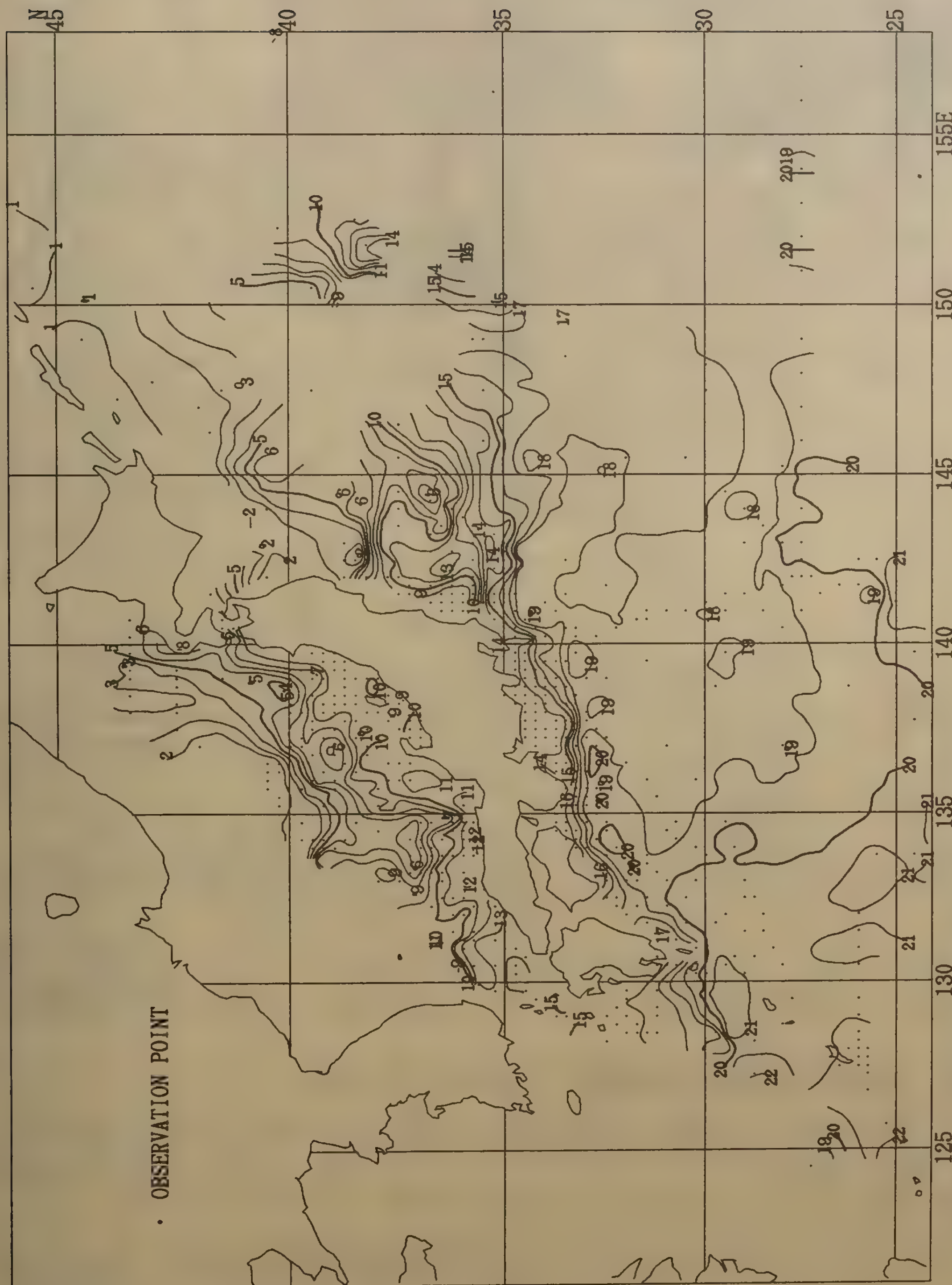
第17図 北西太平洋月平均海面水温図(上)及び偏差図(下)(1994年 3月)

Fig.17 Monthly mean SSTs in the western North Pacific (top) and anomalies (bottom) for MAR 1994. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.



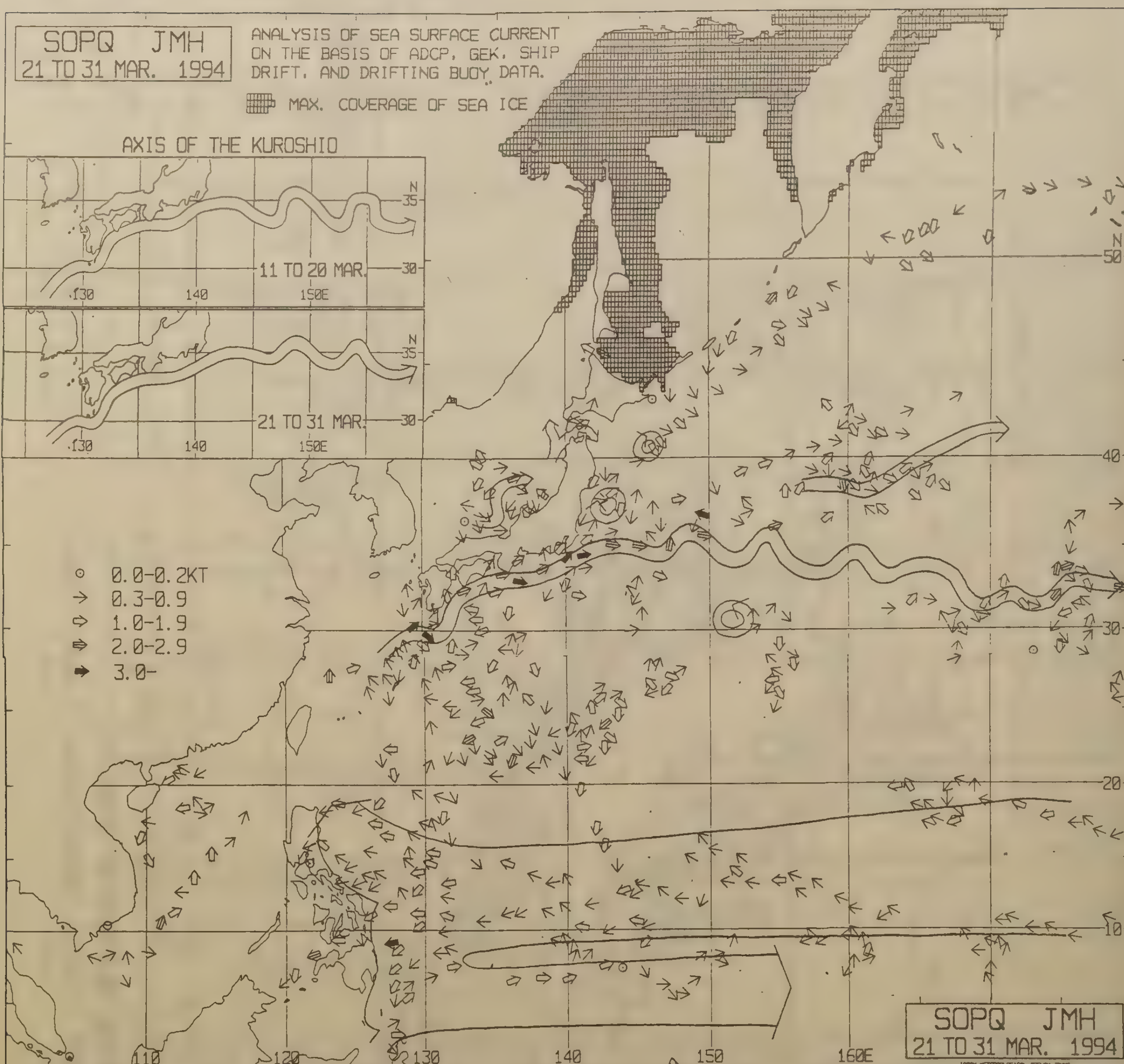
第18図　北西太平洋旬平均海面水温平年偏差時系列図

Fig.18 Time series of the ten-day mean sea surface temperature anomalies (°C) in the western North Pacific for the areas indicated at the bottom. Negative anomalies are shaded. Anomalies are computed with respect to the JMA climatology (1961–90).



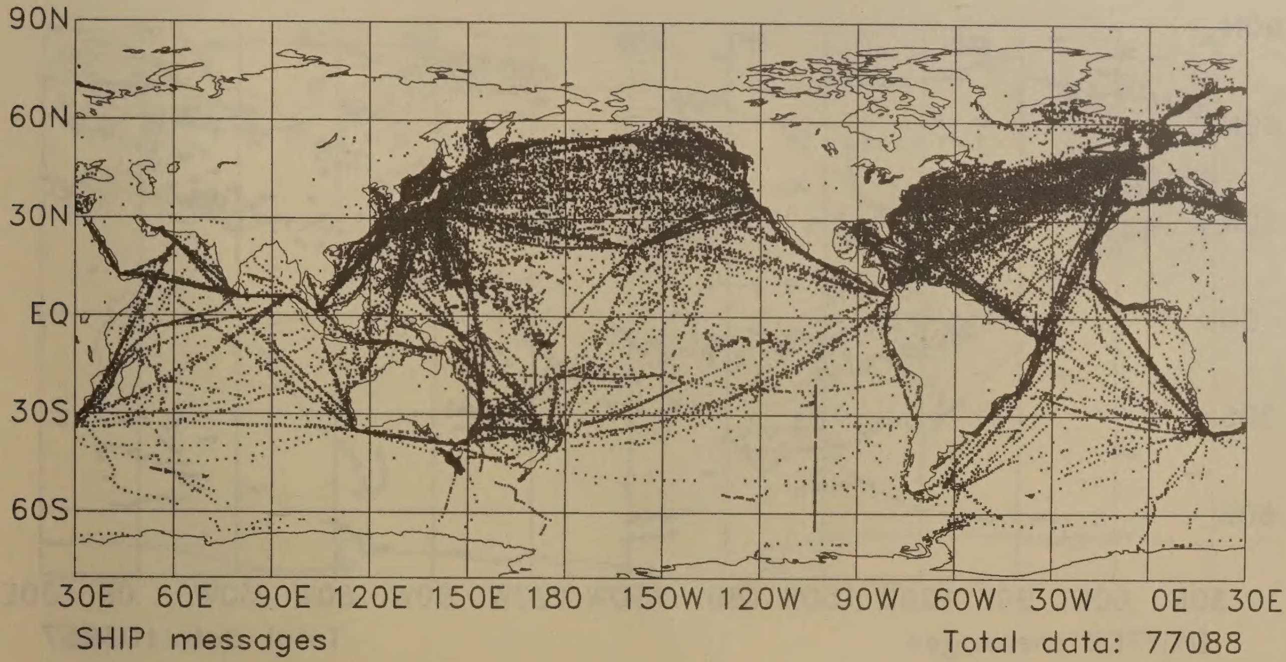
第19図 日本近海表層水温（深さ100M）図（1994年 3月）

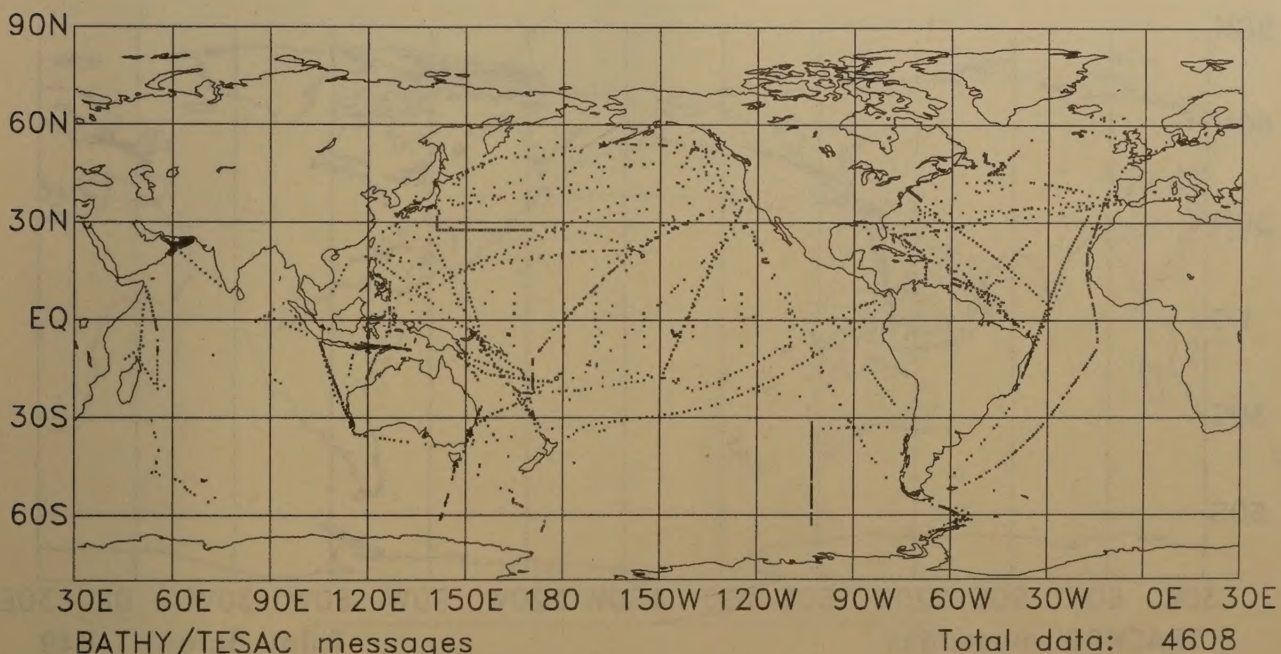
Fig.19 Subsurface (100m) temperatures in seas adjacent to Japan for MAR 1994.



第20図　北西太平洋旬平均海流図（1994年 3月下旬）

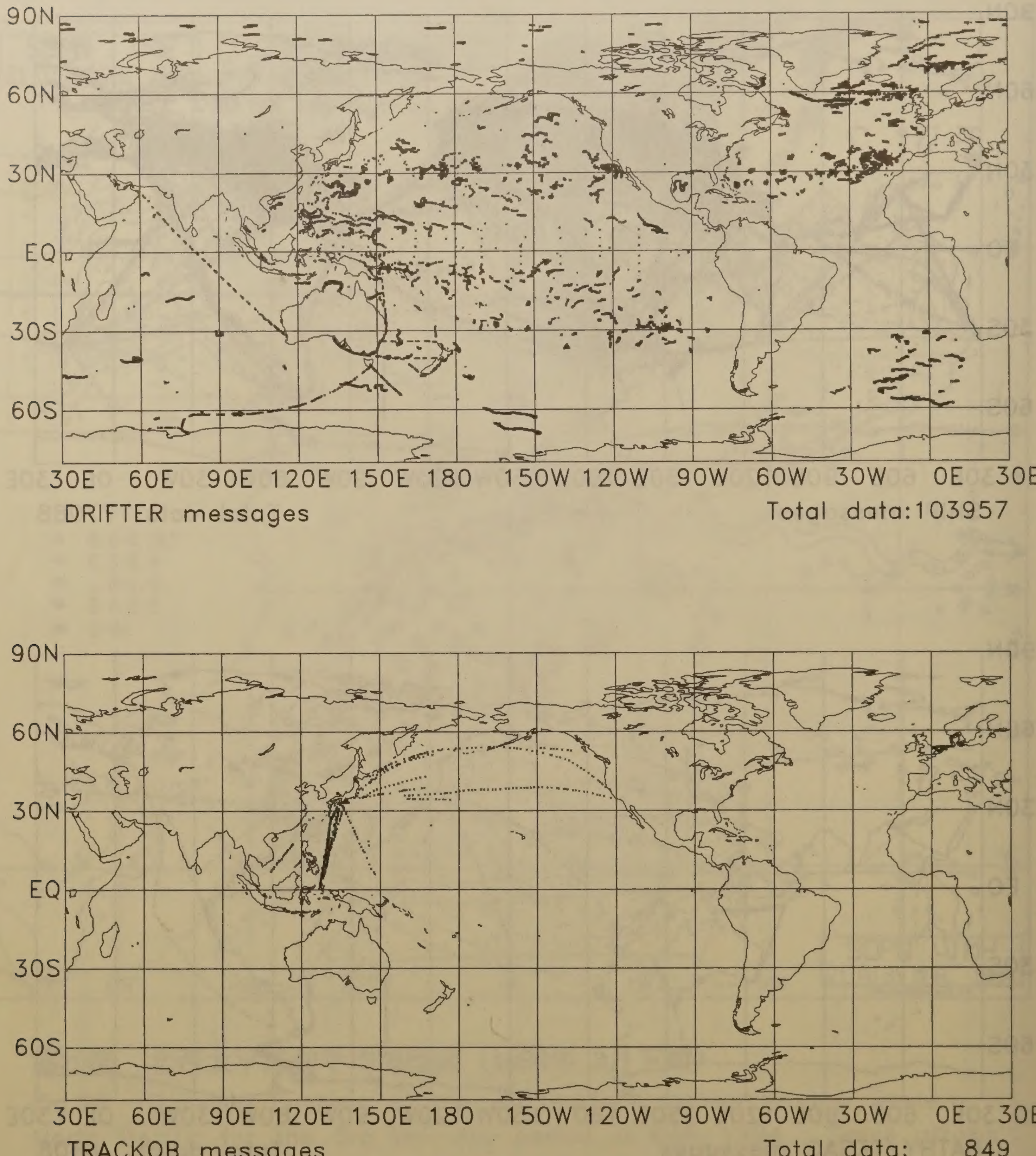
Fig.20 Ten-day analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in MAR 1994. Small arrows indicate sea surface currents measured with acoustic Doppler current profilers, GEKs deployed in research vessels, and ship drift by merchant ships/drifting buoys during the month. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.





第21-1図　測点分布図(1994年 3月)

Fig.21-1 Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for MAR 1994.



第21-2図　測点分布図(1994年 3月)

Fig.21−2　Geographical distribution of DRIFTER messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for MAR 1994.

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